NUTRITION AND DYSENTERY

MUKERJI

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PREFACE.

From a Physiological point of view—there are two obvious and serious defects in the experiments, which form the basis of these papers. The first defect is the overlapping of the results. A small quantity of fish is added for 10 days, to an otherwise purely vegetable diet of a man. The effect in the elimination of urea, for that period is noted. Then the fish is stopped for some days. The effect on urea for that period, which lasts for a week or so, is noted. Finally, oil is rubbed on the body of the same man for 10 days and the effect on urea is again noted. This goes on for sometime. The question arises, how far do the effects of the first experiment, influence the result of the second or the third experiment.

The second defect is, that the conclusions are based on insufficient data. The amount of Nitrogen, that is eliminated from the body, with urea, is only a part of what escapes from the system. Unless the total quantity can be estimated, namely, all that pass from the skin, Lungs, Kidneys and the Bowels, the calculation of Nitrogen obtained from urea alone, cannot be accepted either to prove or to disprove any statement.

From a Physiologist's point of view both the objections, are unanswerable. At the same time, something may be said about the justification of the experiments.

First, as regards the chance of overlapping. There is no such thing, practically speaking, as a mathematical precision in the amount of secretions or excretions from the Human Body. Consequently when the effects of the addition of a certain food or drug, or that of its abstraction from the food, exaclty commence or end or when toleration sets in, cannot be determined by any known means in our possession. The object in view, was not so much to estimate the exact amount of urea passed, as it was to find out, what the indications were, that could be traced, as to the working of the system under a certain condition. It may be added, that each series of experiments was repeated three times, and the conclusions were based on the general result.

In the next place, whether it is possible to institute experiments, on a large number of Human Beings on the same lines as the well-known experiments of Pettenkofer and Voit is more than doubtful. Even if such experiments could be performed, their value will be extremely questionable, for the artificial surroundings, and the abnormal conditions that it will be necessary, to keep the subjects under, for their proper study,

will introduce, factors, that would so affect the results, that they can never be held applicable to an ordinary healthy man, living under normal conditions of life.

If Physiology is to help Medicine, it will have to do so, in the vast majority cases, for a long time to come, more by suggestion than by demonstration.

U. N. M.

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Calcutta.

It is gratifying to note, that since the following pages were written, the Local Anglo-Indian Administration has sanctioned the issue of fish, also of oil in more liberal quantities to the prisoners in the Bengal Jails.

U. N. M.

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List of Corrections.

Page.	Line.	For.	Read.
60	26	Lov	Low.
69	6	India	in India.
74	11	concrened	concerned.
88	8	remarkable	remarkably.
96	7	extractivity	extra activity.
,,	8	contengancy	contingency.
,,	10	Notrogenous	Nitrogenous.
97	13	Bowels	System.
104	25	536	530
107	2	48	42
119	19	not	are enjoined not
,,	20	abstain	to abstain.
120	9	more common	common.
,,	10	fatal	fatal and serious.
136	26	1005	1005 and under.
,,	26	11	14
,,	27	4	7
,,	28	6	5
145	20	Hindu	Low caste Hindu.

APPENDIX.

Pages.	Line.	For.	Read.
167	10	52·59	52·50
175	9	1004	1016
175	9	18·60	48·50
184	11	1400	14·50
184	14	1156	1150
202	8	2·83	1·83
205	9	10·54	19·54
211	5	1·28	2.28
"	5	1014	1024
"	6	18·90	28·90
"	10	11·6	1·26
"	13	1·74	2·74

NUTRITION AND DYSENTERY.

SECTION 1.

—o—

Preliminary observations—Questions to be dealt with in these papers—Some familiar facts connected with changes in the habits of the people.

During the period from September 1901 to January 1904, there were treated in the hospital attached to the Mymensing District Jail—530 cases of dysentery, with the result that only one case out of the number proved fatal. The case as will be seen presently, did not introduce any factor that is likely to interfere with the question, that is the object of the following pages to discuss. The man had been suffering from chronic dysentery for a long time before imprisonment. When admitted into the Jail, he had to be taken straight into the hospital, where he died in 15 days, more from Asthenia due to general debility than from any symptom generally connected with dysentery. Post Mortem examination revealed considerable denudation of the mucous membrane of the large intestines and it was abundantly clear that for a long time past assimilation was most defective.

Gratifying as the result of treatment was, the only interest the figures possess from a scientific

point of view lies in the fact, that with the exception of the first few, all the cases were treated on a practically uniform method of treatment. A quarter of a grain (·065 grammes) of Subchloride of mercury was practically the only medicine used. This was found sufficient in almost all the cases to remove the symptoms peculiar to the disease. As it can be expected, the cases were of varying degrees of severity, the patients were of different ages, every one of them had a distinctive peculiarity of constitution and every case had a pathological individuality of its own. Yet in face of all these disturbing elements, the fact that practically the same and unvarying method of treatment brought about the recovery in every case, suggests the presumption that there is something of the nature of a specific, in the remedy employed, that exerts directly or indirectly a curative influence on the MATERIES MORBII producing the symptoms, connected with the disease with which we are familiar under the name of dysentery. I hasten to add that nothing is further from the object of these papers than to suggest any such idea.

Whether dysentery is a single malady or it stands for a number of diseases, which have some symptoms in common or, whether the symptoms are due to varieties of the same disease each depending on special pathological conditions, are questions that have not been touched upon, in the follow-

ing pages. The considerations that led me to institute the enquiries to be detailed later on, may be briefly stated as follow :—

1. Why should dysentery be so common among the Jail Population ?
2. If it is due to change of food, what is the nature of the change and how does it affect, the system to produce the symptoms that are grouped under the name of dysentery.
3. And finally, why should a small dose of Subchloride of mercury be found effective to remove those symptoms.

These questions were studied among prisoners not only because they furnished the cases, but for the special facility, I had as the Superintendent and Medical Officer of the Jails, to carry on the investigations. The food the prisoners ate, the water they drank, the clothing they wore, the barracks where they slept, their rest and work, in short every thing connected with their lives, from the day they entered the Jail—were under close and constant supervision. For the purpose of studying the subject of nutrition it is impossible to think of a more favourable place than a Bengal Jail.

That the question of causation of dysentery is closely connected with the question of nutrition, is a recognised fact, but there are certain facts in connection with the latter as observed among the

people of the country, that are not so familiar to European Physiologists as they are to Bengali Medical men. These conditions are not only well known to Bengali Doctors, but the people in general are aware of their nature. That certain deviations from their usual habits and modes of life are followed by certain well marked symptoms, are perfectly well recognised and the people adopt measures to remedy the evil effects, whenever any, results from such irregularities. A few examples will explain the nature of some of these. It should be stated here that these remarks apply chiefly to the people of Bengal.

A man or a woman who is in the habit of eating fish has for some reason or other to stop its use, temporarily or permanently. The last happens invariably in the cases of Hindu widows who on the death of their husbands, adopt at once the austerities of a convent life. The use of any animal food in the way of fish or flesh is at once stopped. Practically no other food is interdicted. The quantity of fish habitually eaten by the people is very small. In families that are fairly well off, one ounce or 28·3 grammes per day with the two meals will be a liberal allowance for an adult. Among poor people the quantity is even smaller. In the case of Hindu widows the sudden discontinuance of this small amount of fish from their daily dietary, is almost always followed by digestive disturbances,

of which dyspepsia, constipation, diarrhœa, and dysentery are the usual symptoms.

Let us take another example. During the periods of mourning, following the deaths of parents or near relatives, both men and women among the Hindus, observe certain austerities for a period, varying from ten days to a month. During this period they not only abstain from the use of fish and flesh but give up the use of oil.

Every Hindu Bengali, and a large proportion of Bengali Mahommedans, use oil on their persons. The men as a rule, use mustard oil and the women cocoanut oil, the quantity varying from one (3·55 c.c.) to two drachms or 7·10 c.c, women as a rule using the larger quantity. The oil is only used immediately before they take their baths, when it is closely rubbed in, on all parts of the body. During bathing, the oil is carefully washed off the skin by means of a wetted piece of stout cloth, helped when the water is not from streams or tanks, by liberal douches of water. The result is that after a bath excepting for a certain amount of gloss and suppleness of the skin, not a trace of the oil used remains on the person.

In the case of persons who are in the habit of using oil before their daily baths, a discontinuance of the practice gives rise to certain well known symptoms. There is some degree of irritation of the mind, sleeplessness, itching of the skin, irritation of

the genito-urinary system evidenced by frequent, scanty and high coloured urine, causing itching and burning during the passage through the urethra and irritation of the bowels, producing constipation, scanty stools with a certain amount of Tenesmus, and burning during the motion of the bowels. Those that suffer from sleeplessness or from symptoms pointing to irritation of the brain or from inflammation, chronic or acute, of any part of the genito-urinary systems or from constipation or dysentery, find their symptoms considerably aggravated by the discontinuance of their habit of daily using oil.

Most of the symptoms mentioned above follow an apparently very different cause. The ordinary dress of the Bengali is made up of thin cotton cloth. If for any reason silk is worn next to the skin, frequently symptoms of a similar nature as mentioned above, show themselves. They appear in some cases within a few hours of the change of dress. The headache in this case is generally more marked, while constipation, flatulence and diarrhœa are the main symptoms which point to some of the disturbances going on in the bowels or in some of the ancilliary organs.

Following closely upon the preceding is the following group of symptoms, that can be testified to, from personal experience both by Indians, and European residents in India. The hot months of

April, May and June, during which the dry scorching wind called 'Loo' blows in the dry United Provinces and the Punjab, however disagreeable they may be on account of the almost intolerable heat, are the healthiest months of the year, so far as the digestive organs are concerned. The appetite is generally keen, those who suffer from dyspepsia, generally feel an improvement, the bowels move more freely, food is more easily digested and inspite of the heat, there is present a general feeling of lightness both of the mind and of the body. Directly the rains set in, about the beginning of July, all these change.

The digestive organs become markedly affected. The appetite falls off, food ingested becomes difficult to digest, there is a marked feeling of heaviness of the body and langour of the mind, indicating plainly that the waste products have not been either completely oxidised or they have been but imperfectly excreted. Dysentery and indeed all bowel complaints are more common in this season than they are in any other. In Bengal where the transition from the hot weather to the rainy season is not so striking, yet the same nature of constitutional disturbance follows the change of season. The digestive organs are similarly affected and the onset of the rains is always marked by an increase in the cases of dysentery and of other bowel complaints.

The question arises whether these four seemingly isolated facts can be accounted for by any general explanation ; whether underlying these four conditions, which can not be said to be connected with or related to each other, there runs a general principle that can offer a satisfactory explanation of the remarkable coincidence, that in all of them, practically the same symptoms, namely irritation of the central nervous system and disturbance of the digestive organs follow the interference with some of their habits or the change of the seasons.

That these four examples mentioned just now are based on facts, there need be no doubt. The universal experience of a nation, covering a period of hundreds of years, confirms the reality of their existence. As mentioned before, not only Bengali Medical men but the people in general are fully aware of their existence and recognise the nature of the disturbance. The terms Rukha, Urdha, Shannik and Kasha as they are called in the different parts of the Province are as well known to the people of Bengal as the familiar terms, cold and headache are known to Englishmen.

SECTION II.

Food of the Bengalis—Rice the staple food—The significance of the expression—One food diet among other nations—Difference between one food diet of Europeans and Rice diet of Bengalis —Food of an English Agriculturist—60 years ago and now—Food of an English mechanic—Food of the vast majority of Bengalis—Its nutritive value—The true import of the expression that rice is the staple food.

Before any explanation can be attempted however, it is necessary that we should know something of the nature of the food and drink to which the Bengalis are accustomed. If the derangements referred to above, are in any way due to any general disturbance, of the general nutrition of the body—using that word in its widest sense—then it is necessary that we should possess some knowledge of the factors that contribute to it under normal conditions. In this section I have tried to give a brief account of the food of the people, mentioning only such facts as are likely to throw any light upon the question of nutrition.

It is generally known that Rice forms the staple food of the Bengalis. This well known fact requires some explanation before the Physiological significance of such a diet can be under-

stood by Europeans. *The food of the people of the country is rice and very little else.* That some form of food, whose chief constituent is starch, forms the principle food of the people in many countries of Europe is a commonly known fact. The poorer Irish used to live almost entirely on potatoes, the poorer Highlanders' only food was oat meal, vermicelli formed the main food of the poorer Neapolitans while the poorer among the Piedmontese lived almost entirely on molenga, a preparation of Indian corn. In Russia the poor people subsist mainly on maize and rye. Such examples can be multiplied almost indefinitely.

This one food diet has almost disappeared from Europe. In Bengal it is the universal rule. It is true that most of them take a certain amount of vegetables, a little fish, and a few even a little meat, when the last can be procured, but all these are taken to help the eating of rice. Some forms of Pulses (seeds of leguminous plants such as gram, peas, lentils) known in this country as *Dhal* are taken with the rice, but they never form a separate dish. In fact fish, flesh or vegetables as separate dishes are not known to the people, rich or poor. A poor Irishman habitually living on potatoes, if he can procure a little meat, will take that as an additional food, and not merely to help the eating of potatoes. A poor Highlander if he can procure some herrings will eat the latter as a separate food

but to a Bengali, rich or poor, fish, flesh or vegetable is an adjunct to help the consumption of rice.

The main and in the vast majority of cases, the only source of nutrition is what can be obtained from boiled rice—sometimes but by no means always—added with boiled pulse or '*dhall*." The proportion of people who habitually use milk and butter, fish and flesh in the quantities common among Europeans will not come to one per cent, if the entire population is taken into account. There is, practically nothing in their religion, forbidding the use of fish or flesh. The Mahomedans can have no possible objection on that ground. Even among the Hindus, the proportion of persons abstaining from animal food, on account of religious considerations, will not be five in a thousand. It is simply due to their poverty that they cannot afford to have any better food. Gelenga in his "Country Life in Piedmonts" mentions that "the lowest convicted felon in England fare more sumptuously than the best free labourer in this country (Italy)." We may leave alone the abundant, substantial and even the tasty food served in English and American prisons. There need be no hesitation in affirming, that out of the 47 districts in which the Province of Bengal is divided, in at least twenty of them, the agriculturists, who form the bulk of the population, fare worse than the prisoners in the Government Jail

of the same district. I have given in Appendix I a short account bearing on the subject, and although it was written to describe the condition of the people, living in the Central and Lower part of Bengal, the difference in the matter of food between the poorer and the so called richer districts, is a difference more of quantity than of quality.

The simple nature of a Bengali's food can be judged more accurately, if we compare it with the food of the poorer class of Englishmen. Thomas Millar in his description of English villages, as they were a little before the middle of the last century, gives the following as the weekly expenditure of an agricultural labourer. It is to be remembered that he chose one of the poorest specimens of a class, at a time when it occupied from a pecuniary point of view the lowest stratum in English society.

	s.	d.		s.	d.
Rent per week	1	6	Requires for meat per week	2	0
Clothes per six	1	0	Tea and coffee	1	0
Bread for six	3	6	Sugar	1	0
Coal, Candle and Soap	0	6	Butter and cheese	1	0
Small-beer and potatoes	0	6	More potatoes, beer, bread	1	0
Flour, lard & milk	0	6	More clothes	1	0
Just to keep alive	7	6	Common necessaries	7	0

In the report of the Labour Commission of

England, held in 1894-95 the following is laid down as the weekly expenditure of an agricultural labourer of that period.

		£,	s.
Weekly wages	...	1	8

WEEKLY EXPENDITURE.

		s.	d.
Bread and flour	...	4	0
Meat ...	...	4	6
Butter ...	...	1	0
Cheese ...	...	0	8
Bacon ...	...	1	0
Sugar ...	...	1	0
Tea ...	...	0	6
Lard ...	...	0	8
Fire and oil ...	...	2	0
Salt and pepper	...	0	4
Tobacco ...	...	0	4½
Soap ...	...	0	6
Rent ...	...	2	0
Total		18	6½

The omission of any mention of expenditure under the heads of beer or spirits, is apt to create some doubts as to the accuracy of the figures, but I think they are regarded to be substantially correct.

In a book intended for study in schools the following is given to be the scale of expenditure

that is supposed to be reasonable for the family of a mechanic earning thirty shillings a week.

		s.	*d.*
Rent and Taxes	...	6	6
Meat ...	...	6	0
Coals & wood	...	2	0
Vegetables ...	...	1	6
Butter & milk	...	2	0
Bread ...	...	3	6
Groceries ...	...	3	0
Pocket-Money	...	2	0
Sundries ...	...	1	0
P. O. Savings Bank	...	2	0
Schooling ...	...	0	6
Total		30	0

THE GROCERIES ARE GENERALLY

				d
907·2 grammes	2 lbs sugar		...	7
113·2	„	¼ lbs Tea	...	9
113·2	„	¼ Coffee	...	4½
453·6	„	1 lbs Rice	...	3
		1 lbs Candles	...	6
		Soap	...	4
		Soda Blacking &c.		2½
		Total	...	3*s.*

(*Domestic Economy*).

It is doubtful if there are five households in a thousand in Bengal, who use or can afford to use the food and the other articles laid down as necessaries, for the family of an English mechanic or even an agricultural labourer.

Without going into lengthy details, it may be said that out of the sixty eight millions of Bengalis (I restrict the term to mean only those who speak the Bengali language) ten millions live on practically rice alone, the quantity of rice in case of quite half the number being less than what is actually needed for the satisfaction of hunger. They take a little vegetable, chiefly such as grow wild in waste places, a little oil, sometimes a little fish—if they succeed in catching any. These are nearly all Hindus who constitute the poorest section of the Bengali population. A microscopic section only habitually use fish and flesh, butter and milk in quantities common among Europeans. All these are taken, as mentioned before, with the rice to help its consumption and none as a special dish.

For an ordinary agriculturist or a village handicraftsman (there is practically no industry in the country, in the sense as it is understood in Europe) or in other words, for the vast majority of the people in Bengal the following may be taken to be the scale of diet.

Rice	1 seer	32 ounces or	907·2 grammes.
Dhall	2 Chitaks	4 „	113·2 „
Vegetables	2 Chitaks	4 „	113·2 „
Oil	¼ „	½ „	14·1 „
Fish	½ „	1 „	28·2 „
Salt			
Treacle			
Tamarinds			
Spices			

The food is taken in three meals, of which the early morning and evening meals are taken cold.

Leaving aside the negligible fraction of the people who come under the second class, it will be better understood now what is meant by the fac that rice forms the staple food of the Bengalis. Poor and generally unpalatable as their food is, it is rendered still more uninviting by an almost unbroken monotony.

Calculated according to Dr. Letheby's Analysis, the nutritive value of such a diet, is almost sufficient. theoretically at least, to maintain the health of an adult employed on ordinary labour, although the amount of nitrogen is somewhat less as will be seen from the following :—

			Carbon *Grains*	Nitrogen *Grains*	
Rice	904grms.	(2lbs.)*	4098 or 265·5grms.	102 or 6·6grms.	* Deducting one fourth as thrown away, in the water, in which the rice is boiled.
† Dhall	113·2 ,,	(4 ozs.)	675 or 43·7 ,,	62 or 4·01 ,,	
Vegetables	113·2 ,,	(4 ,,)	105 or 6·8 ,,	4 or 0·259 ,,	
Oil	18·3 ,,	(1 oz.)	300 or 12·4 ,,	...	† Calculating it as peas.
Fish	20·3 ,,	(1 ,,)	355 or 23·0 ,,	12 or 0·777 ,,	
Total		...	5333 or 345·6 ,,	180 or 11·7 ,,	

The average per day for low-fed operatives (English) adults, according to Dr. F. Smith is 4881 grains or 316grms. of carbon and 214 grains or 13·9 grammes of nitrogen ; while for well-fed operatives, according to Dr. Playfair, the proportions are 5837 grains or 371·2 grammes of carbon and 400 grains 25·9 grammes of nitrogen. In the case of the English operatives, the carbon and nitrogen are derived from Bread, Butter, Potatoes, Sugar, Fat, Meat, Milk, Cheese and Tea ; while in the case of a Bengali, practically the only source of carbon and nitrogen is the boiled rice and a little boiled dhall.

To ascertain the nutritive value of any diet, however, it is necessary to find out the value of that portion of it, that is assimilated and not of the quantity that is eaten. The digestion or assimilation of different kinds of food, requires the work of many organs. A large amount, say six pounds 2721·6 grammes of rice will be theoretically equivalent to (400) four hundred grains or 25·9 grammes of nitrogen and 16000 thousand grains or 1036·9 grammes of carbon, but the enormous amount of work, that will be thrown upon the system to digest and assimilate the huge amount of starch, will it is almost sure, to use a popular phrase, up-set the digestion. It will put the digestive organs to so much extra strain, that the whole machinery will be thrown out of order, and the actual potential stored up in the system, will be

considerably less, than the calculated amount which any previous laboratory experiment will lead us to expect. And the final gain to the system will be seriously interfered with, on account of the resulting defective assimilation, following the dislocation of the digestive machinery.

Whether such a thing occurs habitually, at least to any appreciable extent, in the case of a Bengali, is a subject that is not the intention of these papers to discuss. It may be mentioned, however, that if the results of experiments detailed later on, be accepted, then there is strong presumption, that inspite of assertions based on theoretical calculations, the actual nutritive worth of an average Bengali's diet is inadequate to maintain a proper standard of health.

SECTION III.

Inunction of oil—does it do any harm—objections urged against its use—how it cleanses—the alleged cleansing property of soap—the shining look of the skin after use of soap—how does soap clean—how does oil clean—practical illustration of the use of oil—its physiological significance—oil as a prarasiticide—summary.

One of the habits peculiar to the Bengalis, is the daily inunction of oil in the way mentioned before. This habit is universal amongst the Bengali Hindus,

the better fed Mahomedans have only partially adopt-ed it. The use of oil is credited by the people not only with cleansing properties, but it is believed by them to possess exceptional nutritive value. Oil has been used in the East, from time immemorial, and in Europe the Romans and the ancient Germans used it habitually. From the frequent references made of it in the Sanskrit Medical and general literature, oil must have been at one time almost universally used by the people of India, but at present the Bengalis only use it on their person. The question to be answered is, how does oil, applied externally on their body as the Bengalis do, affect the system ?

Has oil applied to the skin, any economic value from a physiological point of view ? Any unfavourable result following its discontinuance, suggests a presumption, that it may be a factor in the case of those who habitually use it, in the maintenance of the norm that is called health. Is the rubbing of oil followed by any recognisable physiological result ?

In the first place it may be asked if it does any harm ? This question cannot be seriously entertained seeing that there are millions of oil-producing glands distributed all over the surface of the body whose function is to secrete oil. The whole body is normally encased in a coating of oil. That the oil thus secreted, is of economic value to the

system, becomes abundantly clear, when for some reason, the oil-secreting glands become obliterated or become otherwise unable to perform their functions. One of the popular European objections against the use of oil on the skin is, that it clogs the ducts and closes the orifices of the sweat and sebaceous glands. A moment's reflection will show that using the oil, as the Bengalis do, it has precisely the opposite effect. It not only cleanses the skin most effectually and helps to keep the pores open, but it accomplishes both these, without doing any harm to the skin.

One way of ridding a room of mosquitoes in Calcutta, used to be (for the practice has gone out as mosquitoes are by no means so numerous as they used to be in the days of open drains) to smear a thin brass plate with oil and use it as a fan in corners where the mosquitoes swarmed. After a quarter of an hour's work, both the surfaces of the plate would be covered with mosquitoes, the sticky oil agglutinating any insect that came in contact with it. The usual procedure in the laboratory to collect the floating bodies in the air, is to expose a glass slide smeared with glycerine. Something very similar to the above, always takes place in the case of the human skin. In the case of the Europeans the body is generally covered with clothes. In this country the men who work in the fields, and all those who are engaged in any

other out-door labour, generally go about, while at work, without any covering above the waist. The human body is always covered with myriads of dust, associated or sometimes contaminated with every thing that floats in the air. If they are allowed to remain undisturbed, they set up a simple or septic irritation according to the nature of the dust. In the case of persons living in colder climates, where the body has always to be kept covered up, the skin is comparatively free from the effects of dust and other floating particles. The skin on that account, however, is not free from foreign or deleterious bodies. There are always the debris of epithelial cells, a certain amount of dust, the secretions, moist or dried up, from the sudoriparous or sebaceous glands, with a covering either of cotton or wool more or less saturated with the above, constantly applied next to the skin. These accumulations cf various things, agglutinated with the secretions, may theoretically clog the orifices of glands, but this they seldom do, as they are cast off by the natural shedding of the superficial epithelial cells. The cleansing is effected more thoroughly during the process of bathing, when the water to a certain extent loosens the crusts, and the subsequent process of rubbing which is generally resorted to, to get rid of the water, effectually removes the moist coating of foreign particles and natural oil secreted from the skin.

Soap is credited with the power of removing dirt from the skin more efficiently than any other means. There is nothing however in the composition of soap which has any specially cleansing property. Its action is merely mechanical. The thin watery sölution called lather, sticks to the surface of the skin longer than plain water will do. Consequently instead of running off as ordinary water will do, it permeates the superficial layer of the skin more thoroughly, agglutinating everything that comes in contact with it. This lather is to be washed off, and the water used for washing is to be rubbed off. All these necessitate friction. The result that naturally follows is, that whatever can be detached from the skin is effectually got rid of.

The peculiar shining look of the skin that immediately follows a vigorous application of soap is not however entirely due to the removal of dirt. If a blade of a knife is dipped in an acid solution, the part that comes in contact with the acid looks bright. The blade owes its newly acquired brightness to the fact that a thin layer of the metal is dissolved by the action of the acid in the solution.

Something like this, follows the use of soap. All soaps contain a certain amount of free alkalies, and the lather which contains a certain amount of free alkalies, if kept long over the skin and rubbed agair.st the epidermis, acts in a way very similar to which acid does in the case of metals.

The terms that are used to extol the virtues of soap are occasionally but too true. That the lather is frothy and creamy we are all familiar with. That it is cooling, is supposed to be one of its virtues. A little reflection will enable any body to see, how it has acquired that title. A vigorous application of soap, means, a corresponding damage to the superficial epithelial cells. The result is, that the nerve endings in the immature cells, which were hitherto protected by the superficial layers of epidermis, come in contact with the external air, and a spurious sensation of coolness is felt. That it is a caustic that accomplishes the so-called cooling, will be realised by any body who has occasion to use plain water and soap water on delicate mucous lining. To describe the lather of most soaps, as a sticky caustic solution more or less scented, may not be chemically accurate, but it is physiologically correct.

If the soap contains a large amount of free alkalies as most common soaps do--and if it is applied on a delicate skin, what is the result that is likely to follow ? The superficial delicate epithelial cells are simply eroded by the action of the caustic alkalies held in solution by the lather. The skin thus loses to a certain extent its natural protection, and whatever benefit a child may derive by the removal of dirt is more than counterbalanced by this constant injury to its natural protective

covering. The indirect results, as will be seen later on, are more pernicious. In the case of adults, similar results follow, although as can be understood, not of such a pronounced character.

How then does oil clean? It follows the process adopted by nature to keep the skin clean and the pores open. Under ordinary conditions, everything that is detachable from the skin, gets agglutinated with the oil during the process of rubbing it in. During bathing, the oil is carefully washed off and everything which had adhered to the oil, whether dust, dead epithelial cells, or any other foreign body, is washed off with the oil. During the subsequent operation of rubbing of the skin, in order to make it dry, the process of cleansing is completed and every speck of dirt or other foreign particle disappears.

The comparative results that follow the use of soap and oil, can be judged nowhere more profitably than in Bengal. In households that have adopted the European habit of the use of soap, the infants are always suffering from cold, and even in this hot and damp country are to be swathed with clothes to keep off the cold; while in the poorer households where the use of soap has not taken the place of oil, the young children seldom complain of cold, although they generally go about with hardly any clothing on their person. In the one case the natural protection afforded by

a healthy skin is daily and carefully injured, in the other case, nature's indications are followed, the structure of the skin is not interfered with, and the result is that it serves the functions for which it is intended.

Far more serious issues are at stake, as will be seen later on. Besides the mechanical results of cleansing the skin and the indirect results that follow from it, there is the undoubted fact, that oil when well rubbed in, is absorbed through the skin. Cod-liver oil is frequently used in this way, and there is no reason to suppose that the skin would behave differently with regard to other oils. The question may be asked as to how does the external application of Codliver oil increase the weight of the body. Is the increase of fat due to increased formative metabolism or is it due to the fact that the fat absorbed directly, finds its way into the blood and is deposited as such, within the system ? According to the former theory, it is contended that when Codliver oil is rubbed on the skin, the fat does not enter the system through the skin, but the Iodine or some other substance present in the Codliver oil, is absorbed through the skin, acts on the central nervous system and in this way indirectly increases the activity of the organs concerned, in the assimilation of fat.

Apart from the consideration, that there is nothing in the way of any proof, likely to lend

any support to such an assumption, clinical experience is directly, against any such hypothesis. Codliver oil is rubbed on the skin, to spare the organs that are concerned in its digestion and assimilation, in such cases only, where it is deemed desirable, that these organs should not be taxed. In cases where the stomach is too weak to retain it, or the liver is out of order and the system is unable to assimilate fat if it is taken internally, then, Codliver oil is rubbed on the skin to spare the weakened organs and not to goad them by medication to further activity. If fat can then be directly absorbed into the system without taxing the energies of any internal organ, one of the chief values of inunction of oil, can be realised. All the organs that are concerned in the digestion and assimilation of fat, will be spared their work to a certain extent. The organ that would obtain the greatest relief will be obviously the liver, and the importance of sparing the liver is a consideration that concerns almost every body who lives in this country or any where in the Tropics. We shall revert to this subject later on.

It will be going beyond the scope of the present papers to discuss or enumerate all the effects that follow the use of oil on the skin. One more may be mentioned. Oil is a most effective parasiticide. The vegetable and animal organisms that settle on the skin, are not only removed by oil but are ren-

dered harmless before they are got rid of, by the process of washing.

Summing up, therefore, what has been said above, about the action of oil on the skin, the following may be stated :—

1. That oil cleanses the skin more effectually, than it can be done by any other agency.
2. That in effecting this, it follows the natural process by which foreign particles are removed from the skin.
3. That in doing this, it does not interfere with the natural development of the epithelial cells, which form the natural covering of the human skin.
4. That by thoroughly cleansing the skin, it facilitates the escape of perspiration, both sensible and insensible, thereby removing from the system certain waste products which would otherwise accumulate and thereby throw additional work specially on the Liver and Kidneys to effect their expulsion from the body.
5. That by the process of rubbing of oil, fat globules are absorbed directly into the system, without throwing any extra work on any internal organ, thus sparing to a certain extent all the organs concerned, specially the liver, the expenditure of energy necessary to digest, and to assimilate the

fat from the food.

6. That oil is a powerful parasiticide and its inunction on the skin, renders harmless any vegetable or animal organism that may settle on the skin.

Granting, it may be urged, that the free alkalies which enter into the compositions of soap can do harm to delicate skins, why should we use more oil while nature already provides us with a sufficient quantity by means of the oil producing glands? Iron is necessary for the blood, phosphorus for the bones, Hydrochloric Acid and Pepsin for gastric digestion. Yet we do not habitually take them besides what may be obtained from ordinary food. Neither Hydrochloric Acid and Pepsin, nor Iron, nor Phosphorus is added to our daily dietary. If we try to take them and persist in our attempt for any length of time, instead of good, harm results. Habitual use of Hydrochloric Acid and Iron will bring on Dyspepsia, habitual use of Iron will produce derangement of the bowels, while Phosphorus if taken for any length of time will cause serious harm.

The Analogy however is not complete. A preparation of Iron taken internally, involves the questions of digestion and assimilation, both processes not only mean the expenditure of a certain amount of energy but they give rise to products that have important bearings on the working of other

organs. From the moment any of the above is taken internally, it ceases to be under our control. Theoretically speaking all the organs concerned with digestion, act and re-act upon it, giving rise to products that affect the whole system. The absorption of oil from the skin does not involve any expenditure of energy on the part of any organ. As a matter of fact it does something very different. As mentioned above, it gives relief to, and lightens the labour of one of the most important organs of the body, namely the liver. The absorption of oil from the skin is a nutritive gain, without causing any corresponding expenditure to the system, potential or dynamic. The practical value of such a gain will be appreciated by every medical man.

SECTION IV.

Effect of inunction of oil and addition of fish on mortality—Khulna Jail and the condition of the prisoners—method of collection and preservation of urine—Hypobromite Method of Calculation of Urea—the general idea and method of observation.

If we compare the scale of diet of a Bengali agriculturist with that of a Bengali prisoner, we notice the omission in the latter of the small amount of fish to which the former is accustomed and the addition of a somewhat larger quantity of Dhall.

There is another point of difference in their methods of living, and that is the discontinuance of the rubbing of oil on the skin. It appeared to me that these two circumstances, trifling as they look, might have a disturbing effect on the general nutrition. In interdicting fish from the diets of rice-eating men (and who were in the habit of using fish in their homes) the Anglo Indian Officials have acted against common sense, that is, experience. From Bengal eastwards, Assam, Burma, the Indo-Chinese Peninsula, China, Japan, in all these countries, the people eat rice but they always take a little fish—fresh or salted—or they take some other form of animal food with the rice. From October 1901 I got the prisoners in the Mymensing Jail to resume the habit of using oil on their persons before their bath, as they used to do it in their own homes and issued to them a very small quantity of fish with their vegetable curry. The exact amount was two seers or sixty four ounces (1814·37 grammes) of fish, thrown in the pot in which the usual vegetable curry for nearly four hundred of the prisoners was cooked.

The quantity was so small that no solid particle of fish, could be seen in the curry, nor even did it modify its taste. For the 2 years and 3 months during which inunction of oil was tried and fish was added to their food, the amount of sickness from all causes, as shown by the number of patients admitted into the Hospital, did not materially

diminish, but the general mortality from all diseases was markedly low. While in the 28 months previous to September 1901 there were 72 deaths from all causes, during the period from September 1901 to January 1904 there were only 17. It is hard to say, what share each of these two factors had in improving the general health or in modifying the nature of the diseases, but the coincidence, if it is merely such, and nothing else, is suggestive, specially, as it coverved a period of over two years.

My intention was to give these a prolonged trial, with the hope to find out, if any Physiological connection could be traced between them, and the causation of Dysentery. After two years' of trial during which over 500 hundred cases of Dysentery were treated, I commenced the series of experiments to be presently detailed. It was to find the effect of small quantities of fish and of inunction of oil on the excretion of urea.

Unfortunately for my object however, I had to leave about this time the Mymensing district for Khulna. The Jail in the latter district is a very small one, the average number of prisoners was 40 against 600 hundred of the Mymensing Jail. The experiments begun at Mymensing had therefore to be given up and started afresh at Khulna.

There were compensating advantages in the Khulna Jail however. The building was a small one and the men could be kept under much closer

observation, than it would be possible in a ··ger Jail. The building, as I have said, was a s..all one, there were only two fair-sized rooms where the prisoners slept at night. A small shed open on three sides, a small room set apart for a Hospital Ward, a cook room and a latrine completed the number of buildings within the walled in Jail enclosure.

The nature of prison labour was very light. It was a transferring Jail, that is, when the number of prisoners went beyond the accommodating capacity of the Jail, a batch was transferred to a large Jail in the neighbouring district of Jessore. There was a certain amount of labour, such as oil pressing, twine.making but the men who were selected for the purpose of observation, were such as had no hard labour to perform. They were employed in such work as were needed for the internal economy of the Jail, such as cooking, drawing water, working in the small Jail garden, and looking after a few Jail cows. The men lived together, and could talk with one another, for, silence is not so rigidly enforced in Indian Jails as in English prisons. Generally speaking the restrictions, such as they were, had practically the effect of ensuring uniformity of hours. The little work the men who were kept under observation, had to do, was just enough to digest their meals.

At first considerable difficulty was felt to train

each man to pass his urine for 24 hours in one vessel, but after some practice, this difficulty was overcome. To ensure cleanliness each man was supplied with two sets of tin vessels one to be used on alternate days. Each was trained to empty his bladder immediately before visiting the latrine and at night a tin was kept, near his bedside in case he had any occasion to use it.

To obviate any risk of decomposition, Formalin—a solution of Formaldehyde—at the rate of 2 drops per 30 cc. of urine was added to the new tins issued every morning. As will be seen from the results of experiments detailed in appendix No. II., this was a superfluous precaution, for even in a hot and damp climate like that of Khulna, there was no perceptible loss of nitrogen for 5 days although the urine smelled strongly of ammonia and gave an alkaline re-action, thus confirming Liebig's assertion "that even fœtid ammonaical urine, provided the decomposition had not advanced too far, often gave the same results (in urea) as fresh urine." (Neubauer).

Although the experiments as mentioned above, were begun at Mymensing during the previous year, those that were performed at Khulna from March 10th to July 3rd 1904 have alone been recorded. If there was any suspicion about the quantity passed or if there was a possibility of introduction of any factor likely to vitiate

the accuracy of the experiments, the specimen was rejected. The occasional blanks that will be found in the tables are due to the above circumstances.

Le Conte's Hypochlorite method was at first tried for the estimation of urea, but after a fairly prolonged trial, it had to be given up as the results obtained, were found to be obviously unreliable. Probably the climate is against the preservation of Chloride of Lime. The results of experiments recorded were those obtained by the Hypobromite method. No special apparatus was used. 5 cc. of urine was used for each experiment and urea was calculated on the basis, that 35 cc. of Nitrogen correspond to one decigramme of urea. Most of the experiments were repeated more than once.

The general idea was, to keep a certain number of men under observation, under the ordinary Jail conditions for a certain period. They took the food prescribed according to Jail Regulations. The amount of urea excreted by each was calculated. Then for ten days, a small quantity of fish was added to each man's food, and the daily amount of urea exereted was noted. After 10 days trial fish was withheld from the diet for about a week, and the effect on urea was recorded: The same procedure was observed with regard to inunction of oil. Each of these two series of experiments was repeated three times. For about a week the effect of minute doses of calomel ·04

grammes, or 1-16th (one sixteenth) of a grain, thrice daily, was recorded. The action of the drug on the bowels threatend to become latterly however, so marked, that it was not thought desirable to repeat the experiments.

The following table shows the dates of the different experiments :—

					Number of men under observation.
March		to	13th	Nothing	7
„	14	„	23	Oil	7
„	24	„	30	Nothing	8
April	31	„	7	Calomel	7
„	8	„	11	Nothing	8
„	12	„	21	Fish	9
„	22	„	28	Nothing	11
May	29	„	8	Oil	9
„	9	„	15	Nothing	9
„	16	„	25	Fish	9
„	26	„	2	Nothing	9
June	3	„	8)		8)
	9	„	12)	Oil	8)
„	13	„	20	Nothing	8
„	21	„	2 July	Fish	8

Nine men were selected at the commencement. Two of these continued to the end. Fresh additions were to be made periodically. The number selected for each series of experiments varied from

(7-11), seven to eleven as some of the men were either transferred or released. An account of their height, weight and occupation has been given in appendix No. III.

Every morning and evening the temperature of the men under observation was taken, and the number and character of their stools was noted. The urine of those that showed any abnormality of temperature was rejected.

The nature and quantity of food taken have been entered in appendix No. III. The water they drank was obtained from a special tank. The water was first boiled, then treated with alum, and after the scum had been removed, it was further treated with potassium permanganate and then served to the prisoners.

The temperature noted is the temperature of the room in which the men lived. The morning temperature was taken at eight and the evening at six.

The rainfall noted is the rainfall for the previous 24 hours, recorded at (eight) 8 A.M. The men were weighed at frequent intervals and the variations have been recorded in appendix III.

The re-action of the urine has not been recorded. The addition of the Formalin Solution rendered the urine in the vessels uniformly acid.

Every morning each sample of urine was tested

for Albumin. On no occasion could any trace be detected.

The prison clothing consisted of a pair of coarse cotton drawers, scarcely coming down to the knees, and a cotton blouse falling below the waist. A thin cotton cap completed the uniform.

SECTION V.

Daily quantity of urine excreted in Europe—a disturbing factor—quantity passed by the prisoners—skin as an excretory organ in the Tropics—its significance—effect of inunction of oil on the average daily excretion of urine—fish on excretion of urine.

The following from Vogel represents the average daily quantity of urine passed by an adult in Europe and the relation between the weight and height of the individual and the quantity of urine passed in twenty-four hours.

" The daily quantity varies between 1,000 to 3,000 cc," and the quantity passed "by well nourished persons who drink freely equals—1,400 to 1600 cc and by those who drink less—1,200 to 1,400 cc."

" If we calculate the mean quantity of urine by the weight of the body we find that in an adult, an average of 1 cc per hour is passed for every Kilo-

gramme of the body weight. Calculating according to the height of the body we find that an adult passes hourly an average of 40 cc of urine for each Centimetre of height."

In Appendix No. III will be found the daily quantity of urine excreted by each man during the period he was kept under observation.

Table of quantities of urine passed by each man

NAME.	750cc. and under.	Above 750 cc. and under 1000cc.	Above 1000cc. and under 1500cc.	Above 1500cc. and under 2000cc.
Guru Charan ...	39	31	32	9
	34.82 p.c.	27.68 p.c.	28.57 p.c.	8.09 p.c.
Rahamatulla Sheik ...	8	4	7	0
Mohim Mandal...	7	9	13	7
Mahomed Hosein	2	3	8	8
Osman Behars ...	6	25	22	7
	10 p.c.	41.3 p.c.	36.7 p.c.	11.5 p.c.
Nanda Shaik ...	6	15	29	37
	5.30 p.c.	13.3 p.c.	25.66 p.c.	32.74 p.c.
Gopal Mandal ...	4	6	21	4
Goni Shaik ...	9	24	28	14
	10.9 p.c.	29.3 p.c.	34.2 p.c.	17.1 p.c.
Ram Ch. Dutt ...	2	6	24	21
	3.57 p.c.	10.7 p.c.	42.9 p.c.	37.5 p.c.
Messer Sheik ...	3	0	2	4
Madan Fakir ...	7	22	37	20
	8.5 p.c.	25.3 p.c.	42 3 p.c.	23.1 p.c.
Sonaton Mandal.	0	9	25	19
		16.36 p.c.	45.45 p c.	34.54 p.c
Bahadur Munsi...	5	11	27	19
	17.14 p.c.	15.71 p c.	38.55 p.c.	27.14 p.c
Begam Chang ...	9	30	36	5
	10.9 p.c.	36.6 p.c.	43 9 p.c.	6.09 p.c
Rasik L. De ...	4	7	11	19
	5.6 p.c.	9.86 p.c.	22.5 p.c.	26.7 p.c
Kani Shaik ...	27	16	14	11
Total ...	138	218	341	20.7
Per cent. ...	14 02	22,1	34.6	20.7

with individual and total per centages.

Above 2000cc and under 2500cc.	Above 2500cc.	Minimum quantity passed.	Maximum quantity passed.	Quantity of urine they should have passed according to Vogel. According to Height.	According to Weight.
1	0	150	2000	1536.00	1197
0	0	500	1500	1555.20	1219
0	0	500	1948	1574.40	1090
1	0	500	2250	1459.20	1143
0	0	600	1950	1555.20	1110
19	7	200	3300	1632.00	1274
16.8 p.c.	6.2 p.c.				
1	0	450	2350	1632.00	1252
5	2				
6 2 p.c.	2.4 p.c.	400	2550	1632.00	1491
3					
5.35 p.c.	0	500	2300	1584.00	1187
2	0	150	2500	......	......
1					
1.1 p.c.	0	300	2200	1594.60	1165
2					
3.63 p.c.	0	800	2150	1546.60	1110
8					
11.43 p.c.	0	150	2500	1507.00	1045
2					
2 4 p.c.	0	400	2400	1438 00	1121
20	5				
28.1 p.c.	7.0 p.c.	600	3650	1594.60	1252
4	0	150	2300	1594.60	1437
69	14				
7.01	1.42				

According to the calculations of Vogel, the quantity of water passed with the urine, is about equal to the combined quantity passed through the skin, lungs and with the fœces. This statement can hardly be maintained to hold good in the case of a Bengali or of any other inhabitant of a Tropical country. In calculating the normal amount of urine passed by an adult in Europe, one conflicting element is the amount of water drunk with tea, beer or spirits. This disturbing factor is of course absent in a Jail in this Country, and among the population in general, it may be regarded as a negligible quantity, as the number of men who habitually drink any of the above, forms an extremely minute fraction of the population.

In Europe any quantity below 750 cc. passed in 24 hours will be regarded as an abnormality. Yet out of 984 separate examinations, in 138 cases, or in other words, in 14 per cent of the total number examined, the quantity of urine passed, fell short of 750 cc. a day. The men did not show any sign of disease or discomfort. Even such a small quantity as 300 cc or 150 cc passed in 24 hours did not cause any noticeable discomfort.

All these figures, throw an indirect light on the immense importance of the skin, as an excretory organ, in a tropical country like India. The same man passes one day 2500 cc. of urine and on another he passes 300 cc. The first is probably a

rainy and comparatively cool day, and he does not drink much water. On the day he passes the small amount of 300 cc., he very probably drinks a larger quantity of water and it is on hot and dry days that the amount of urine decreases. Under practically similar conditions of food and work, the amount of water that escapes from the body, is got rid of either by the Kidneys or Skin : the variations depending on the temperature and on the humidity of the atmosphere ; but the relative shares that fall on the two organs are in proportions unknown in European countries. The work of the Kidneys so far as the excretion of water is concerned, is taken up practically by the skin, thus affording relief to that organ directly, and at the same time indirectly helping to cleanse the system of waste products.

As mentioned before, a certain number of men was kept under observation, and the effect of inunction of oil and the addition of a small quantity of fish to their daily diet was noted. In Appendix No. III will be found the daily amount passed by each man, under the different conditions.

The following tables give the daily average amount of urine passed by each. The first column shows the quantity passed when no oil was used ; the second shows the effect of oil on the excretion of water.

EFFECT ON INUNCTION OF OIL ON THE AVERAGE DAILY SECRETION OF URINE.

When no oil was used. When oil was used

1st Series.

	March 14	March 15-24
	cc.	cc.
G. C.	1557	107
R. U.	1225	79
M. M.	1574	188
M. H.	1909	144
O. B.	1327	907
N. S.	2140	166
G. M.	1176	1110

Number of rainy days—Nil. Number of rainy days Nil.

Total amount of rainfall Nil. Total amount of rainfall Nil.

2nd Series.

When no oil was used. When oil was used.

	April 23-29	April 30-9 May.
	cc.	cc.
G. C.	900	710
N. S.	1159	1450
R. C.	1431	1310
M. F.	1243	1507

S. M.	1450	1314
B. M.	1350	1107
D. C.	900	864

Number of rainy days—Nil.	Number of rainy days ... 3
Total amount of rainfall Nil.	Total amount of rainfall ... 3·54″

3rd Series.

	When no oil was used		When oil was used.
	May 27.– June 3.–	June 4–9.	June 10–13.
	cc	cc	cc
G. C.	781	510	1650
N. S.	1694	1267	2100
M. F.	1231	1010	1700
B. M.	1687	1110	2250
G. S.	1156	1125	2162
B. C.	1206	808	1575
R. D.	1712	1808	2450
K. S.	1140	610	2063
	Number of rainy days ... 3	Number of rainy days ... 2	Number of rainy days 4
	Total amount of rainfall ... 1.70″	Total amount of rainfall ... ·2″	Total amount of rainfall 1.99″

In the first series of experiment with oil, 7 men were kept under observation, under ordinary Jail conditions. That is, neither oil nor fish was allowed. The amount of urine passed daily was

recorded. Then oil was rubbed on the body before their bath, in the way they were accustomed to do, when they were in their homes. The quantity of urine decreased in the cases of 6 men and increased in the case of one. There was no rainfall in both the periods.

In the second series of experiment, 8 men were kept under observation. In 6 there was a decrease in the quantity of urine and 2 showed an increase. The number of days on which rain fell, and the amount of rainfall were nil against 3 and 3.54″ respectively of the second period.

In the third series of experiment, 8 men were kept under observation. During the first period, that is, when oil was not rubbed there were 3 rainy days and the total amount of rainfall was 1.70″ inches. The succeeding 10 days during which oil was allowed to be rubbed on the skin, should be divided into two periods. For the first 6 days, there was but little rain (·2 inches). The amount of urine fell off in 7 and increased in 1. During the last 4 days there were fairly heavy rains (2.199″ inches). In spite of the use of oil, the amount of urine increased in every case—the excess being marked in every case ; in some cases, amounting to as much as three times the quantity passed in the previous 6 days.

The conclusions that these figures point to are :—

1. That inunction of oil on the skin, leads to decreased excretion of urine.
2. That sudden increased humidity or a sudden fall in the temperature of 5 degrees or even under, markedly increases the quantity of urine and modifies or neutralises any effect due to rubbing of oil.

The following tables show the effect of the addition of small quantity of fish to the daily diet, on the execretion of urine.

1st Series.

	When no fish was used. April 9-12.	When fish was used. April 13-22.
	cc.	cc.
G. C.	1050	931
M. M.	1362	925
O. B.	1412	1105
N. B.	1287	1877
G. M.	1100	1425
R. D.	1400	1300
M. F.	1212	1155
S. M.	1287	1455
	Number of rainy days 3.	Number rainy days 2.
	Total rainfall ... 2.19″	Total rainfall ... 1.06″

2nd Series.

When no fish was used. May 10-16. — When fish was used. May 17-26.

	cc.	cc.
G. C.	993	740
N. S.	1914	1125
M. F.	1314	1185
S. M.	1536	1570
B. M.	1300	1270
G. S.	1264	1270
B. C.	986	1110
R. De.	1721	1615
K. S.	964	925
Number of rainy days	... 4	... 5
Total rainfall	3.76″	6.89″

3rd Series.

	When no fish was used. June 14-21.	When no fish was used. June 22 July 3.
	cc.	cc.
G. C.	988	1033
N. S.	1744	1900
M. F.	1194	1287
G. S.	1650	1254
B. C.	1488	1387
R. D.	1931	2900
K. S.	1463	1191
Number of rainy days (day)	... 5	... 10
Total rainfall	... 2.69″	... 4.03″

In the series of experiments with fish, as in the case of oil, a number of men was kept under observation for two periods. In the first period, they were given only the ordinary Jail diet, which did not include fish. The daily amount of urine excreted was noted. For 10 days subsequently, a small quantity of fish was added to their vegetable curry.

In the first series of observation, 8 men were kept under examination, of whom 5 showed a decrease, and 3 an increase. The number of rainy days and the total amount of rainfall during the first period were three and 2.19″ inches respectively against two and 1.06″ inches of the second period.

In the second series of experiments with fish, 9 men were kept under observation, 6 showed an increase, 2 showed a decrease, and in the case of one, the quantity remained practically unchanged. The number of rainy days and the total amount of rainfall during the first period were 4 and 3.76″ inches respectively against 5 and 6.89″ inches of the second period. In the third series of experiments 7 men were kept under observation. Three showed a decrease while in the case of 4 there was an increase. The humidity of the atmosphere had however markedly increased during this period. The monsoon had set in, and the rainy season had commenced.

During the periods that the series of observation were make no oil was rubbed on the body.

The results of the three sets of observations point to the following conclusions :—

1. That the addition of a small quantity of fish to an otherwise purely vegetable diet, tends to decrease the quantity of urine excreted.

2. That the effect however is counteracted by the increased humidity of the atmosphere.

SECTION VI.

Amount of urea excreted by an adult in Europe—amount of urea obtained in the experiments—effect of inunction of oil on the excretion of urea—effect of a small quantity of fish on the excretion of urea—specific gravity of urine observed—total solids obtained—effect of inunction of oil on the excretion of total solids—effect of inunction of urea—effect of Calomel on the excretion of urine and of urea.

The amount of urea normally excreted by an adult man in Europe has been variously stated by different observers. Beale estimates it from 25 to 40 grammes per day, in case of a European living

on mixed diet. Neubauer gives the figures from 22 to 35 grammes, while Mehu calculates the amount to vary from 15 to 20 grammes per day.

In the case of Europeans "numerous investigations made by different observers, show that a well fed healthy adult man, passes on an average from 32 to 40 grammes of urea in 24 hours," and we find "calculating according to the weight of the body that on the average in 24 hours, from ·37 to ·60 grammes are passed for each Kilogramme of the body weight" (Bischoff.)

The following table will show the average quantity passed under various conditions by the Bengali prisoners during the time they were under observation. Their food, work and mode of life have already been described. The last two columns show the quantities each should have passed according to Bischoff's calculations. It will be seen that the quantity is less than that of an European adult and approaches more nearly Mehu's estimate.

Table of quantities of urine passed by each man

NAME.	Under. 10 Grammes.	Above 10 and under 15grms.	Above 15 under 20grms.	Above 20 under 25grms.
Guru Charan ...	4	22	32	31
	3.55 p.c.	19.6 p.c.	28.5 p.c.	27.67 p.c.
Rahamatulla Sheik ...	1	5	8	4
Mohim Mandal...	1	21	11	2
Mahomed Hosein	3	11	7	1
Osman Behara ...	1	15	24	14
	1.66 p.c.	25.6 p.c.	40.0 p.c.	23.3 p.c.
Nanda Shaik ...	8	30	48	20
	7.08 p.c.	26.6 p.c.	43.4 p.c.	17.7 p.c.
Gopal Mandal ...	1	8	16	9
Gani Shaik ...	2	10	22	20
	2.44 p.c.	12.2 p.c.	26.8 p.c.	24 4 p.c.
Ram Ch. Dutt ...	5	6	26	17
	8.93 p.c.	10.71 p.c.	46.42 p.c.	30.36 p.c.
Messer Sheik ...	2	2	5	1
Madan Fakir ...	1	11	18	34
	1.15 p.c.	21.6 p.c.	20 7 p.c.	39.1 p.c.
Sonaton Mandal.	1	13	21	12
	1.81 p.c.	23.64 p.c.	38.18 p.c.	21.8 p.c.
Bahadur Munsi...	2	9	25	18
	2.85 p.c.	12.85 p.c.	35.7 p.c.	25.71 p.c.
Begam Chang ...	10	45	19	6
	12.2 p.c.	54.9 p.c.	23.2 p.c.	7.32 p.c.
Rasik L. De ...	0	7	13	20
		9.9 p.c.	18.3 p.c.	28.2 p.c.
Kanai Shaik ...	0	5	22	20
		6.95 p.c.	30.55 p.c.	27.67 p.c.
Total ...	42	220	317	229
Per cent. ...	4.26	22.5 p.c.	32.2	23.2 p.c.

with individual and total per centages.

Above 25 Grammes.	Minimum	Maximum	Amount of urea they should have passed according to Bischoff's Calculation.	
			Lowest.	Highest.
23 / 20.54 p.c.	9.25	25.49	18.46	29 93
1	8.22	26.40	18.79	30.48
1	10.86	31.20	16.80	27 24
0	10.86	21.74	17.62	31.27
6 / 10.0 p.c.	10.40	33.97	17.11	27.76
7 / 6 2 p.c.	8.00	34.40	19.36	31.84
2	8.22	40.29	19.30	31.29
28 / 24.01 p.c.	8.23	38.57	22.99	37.28
2 / 3.56 p.c.	8.80	30.71	18.29	29.65
1	5.20	41.14	......	29.12
23 / 26.5 p.c.	10.80	44.75	17.85	......
8 / 14 5 p.c.	10.57	34.74	17.11	27.76
16 / 22 85 p.c.	8.40	35.66	17.11	26.12
2 / 2.44 p.c.	7.71	29 83	17.28	28 03
31 / 43.6 p.c.	11.43	41.60	22.15	35.92
25 / 34.72 p.c.	14.17	46.86	19.30	31.29
176 / 17.8 p.c.				

To judge of the effects of inunction of oil, on the elimination of urea a series of observations on the same lines as in the case of urine, were tried. A number of men was kept under ordinary Jail condition—these were not allowed to use oil on their persons or take any form of animal food. The average amount of urea passed by each during the period was noted. Then they were allowed to rub oil on their persons—the quantity and method of application being as much as possible, similar to what they were used to, in their own homes. The daily amount of urea exereted by each was then estimated. The use of oil was stopped, and the amount of urea excreted under the altered condition was calculated.

These series of experiments were repeated three times. The daily amount of urea that was obtained has been noted in Appendix No. III. The three following tables give a summary of the results obtained.

INFLUENCE OF INUNCTION OF OIL ON THE EXCRETION OF UREA.

1st Series.

	—14 March Daily average quantity Grammes.	15—24 March Daily average quantity Grammes.
G. C.	20.79	21.84
R. U.	17.31	17.34

M. M.	18.61	16.26
M. H.	14.38	16.74
O. B.	14.97	16.51
N. S.	18.43	17.61
G. M.	18.86	20.89

2nd Series.

	23—29 April. Daily average quantity Grammes.	30 April to 9 May. Daily average quantity Grammes.
G. C.	23.23	21.63
O. B.	20.75	24.12
N. S.	12.78	17.42
R. Datta	19.81	20.47
M. F.	18.03	24.51
S. M.	16.23	19.18
B. M.	25.72	20.59
G. S.	22.14	25.53
B. C.	15.56	13.93
R. De.	24.37	20.75
K. S.	19.62	20.28

3rd Series.

	27 May to 3rd June. Daily average quantity. Grammes.	June 4—9 Daily average quantity. Grammes.	June 10—13 Daily average quantity. Grammes.
G. C.	17.77	19.13	21.69
N. S.	20.00	19.75	14.76

M. F.	26.14	15.28	19.83
B. M.	23.30	23.60	19.03
G. S.	24.07	27.86	17.99
B. C.	15.52	22.85	8.53
R. De.	25.46	26.01	18.91
K. S.	27.28	27.59	17.96

In the first series of experiments 7 men were kept under observation. Under the use of oil, the average amount of urea increased in 5 cases and diminished in two, and when the use of oil was discontinued, it fell off in the case of 5 and increased in the case of three.

In the second series of experiments, the effect of oil was tried on 11 men. In the case of seven the amount of urea showed an increase, while four showed a decrease. Nine of these men were available (two had been discharged from the Jail) to watch the effects of stopping the oil. Of these nine persons, the cessation of the rubbing of oil was followed in the case of eight by a falling off in the amount of urea, while one showed an increase.

In the third series of experiments conducted under similar conditions as the above, the effect was tried in the case of eight persons. Oil was rubbed for 10 days. During the last four days there were heavy rains. Taking the average of urea excreted on the first six days—the amount showed an increase in the case of six, diminishing

in the case of one and neither increasing nor decreasing in the case of the eighth. During the last four days of heavy rains however, the amount of urea fell off in seven cases out of eight, and in all, the fall was very marked. In one case the average daily amount of urea fell off from an average of 22 grammes to an average of 8 grammes per day. During the succeeding ten days when the rubbing of oil was discontinued, the amount of oil excreted was less than what was passed during the first period when oil was rubbed in, but it showed an increase on the quantity passed, during the four days when the rains had set in.

The conclusions that these experiments seem to point to are :—

1. That innuction of oil has the effect of increasing the excretion of urea.
2. That increased humidity has a tendency to diminish its excretion and that, rubbing of oil under such conditions, has no appreciable effect.

Before trying to discuss the significance of these figures, the effect of addition of a small quantity of fish to their vegetable diet may be noted. A small quantity of fish as mentioned before was added to their vegetable curry for ten days. The average amount of urea excreted daily when no fish was given was noted, then the

amount passed during the period when fish was given was calculated, and finally the result of stopping the fish on the excretion of urea was recorded.

These series of experiments were repeated three times. Daily figures are given in Appendix No. III. In the following tables the summary of the results is shwon.

Influence of fish on the Excretion of Urea.

1st Series.

	April 9-12. Daily average quantity Grammes	April 13-22. Daily average quantity Grammes
G. C.	18.93	19.53
M. M.	16.00	17.24
O. B.	19.50	19.07
N. S.	12.06	15.43
G. M.	15.63	19.26
R. Datta	17.23	19.85
M. F. E.	19.17	19.67
S. M.	15.13	19.20

2nd Series.

	10-16 May, Daily average quantity Grammes	17-26 May Daily average quantity Grammes.
G. C.	18.35	22.75
N. S.	17.31	17.93

M. F.	21.20	26.71
S. M.	16.37	26.40
B. M.	16.69	19.63
G. S. F.	19.20	18.36
B. C.	13.84	15.82
R. De.	20.40	26.59
K. S.	20.76	28.66

3rd Series.

	14-21 June Daily average quantity Grammes	21 June to 3rd July. Daily average quantity Grammes.
G. C.	18.56	21.82
N. S.	19.56	20.75
M. F.	23.59	23.65
G. S.	21.54	23.35
B. C.	13.49	14.69
R. De.	24.27	24.62
K. S.	22.19	25.77

During the first series eight men were kept under observation. Fish was given for ten days in their vegetable curry. Urea increased in the case of seven men and diminished in the case of one. When the fish was discontinued, the urea diminished in five and increased in four.

For the second series of experiments nine men were selected, and a little fish was added to their vegetable curry. Elimination of urea increased in the case of every one. When the fish was dis-

continued, it decreased in seven cases and showed an increase in two.

For the third series of experiment, eight men were given a little fish. Urea increased in the case of every one of these; the effect of discontinuance of fish could not be studied in these cases as the experiments had to be discontinued.

The conclusions that can be drawn from these figures, as could be expected are :—

1. That the addition of a small quantity of fish increases the amount of urea excreted, and that its withdrawal has the effect of dimishing the excretion.
2. That increased humidity of atmosphere has a tendency to diminish the excretion of urea, though not to the same extent that it has when oil is rubbed on the skin.

The specific gravity of the urine of a healthy European adult is estimated to range from 1015 to 1025. In appendix No. III has been given the specific gravity taken daily, of the total quantity of urine passed during the previous 24 hours. As urea constitutes nearly half of the solids, it is intelligible that the specific gravity of a sample of urine, which is deficient in urea should be lov.—The following table will give some of the particulars :—

Table of Specific Gravity of urine of each man and the average percentage.

NAME.	1010 & under.	Above 1010 & Undzr 1015	Above 1015 & under 1020	Above 1020 & under 1025	Above 1025	Maximum.	Minimum.
Guru Charan ...	23	28	41	15	5	1030	1006
Rahamatulla ...	4	4	8	3	...	1024	1010
Mahim Mandal ...	16	14	6	...	...	1020	1006
Mahammad Hosen	18	3	1	...	...	1020	1004
Osman Behara ...	12	14	28	6	...	1024	1010
Nanda Shaik ...	90	17	4	2	...	1024	1004
Gopal Mandal ...	7	21	8	...	...	1020	1010
Ganee Shaik ...	22	22	35	2	1	1026	1006
Ram Ch. Dutta ...	43	10	3	...	...	1020	1006
Messer Shaik ...	7	1	1	...	2	1040	1008
Madan Fakir ...	36	28	22	1	...	1022	1004
Sonatan Mandal...	28	22	5	...	...	1020	1006
Bahadur Munshi...	33	24	12	1	...	1022	1004
Begam Chang ...	25	35	19	2	1	1030	1006
Rasik Lal De ...	37	20	12	2	...	1022	1006
Kanai Shaik ...	17	15	23	4	13	1030	1004
Total ...	418	278	228	38	22		
Percentage ...	42.47	28.25	23.17	3.86	3.23		

The quantity of total solids has been calculated according to Christison's formula. The following table will give some particulars of the amount of total solids passed by each prisoner under the varying conditions during the time he was under observation.

Table showing amount of Total solids passed by each with percentage.

NAME.		30 grms. & Under.	Above 30 grms. & Under 40.	Above 40 grms. Under 50.	Above 50 grms. & Under 60.	Above 60 grms.	Maximum.	Minimum.
Guru Charan	...	55	37	16	1	3	79.30	12.00
Rahamatulla	...	10	6	2	1	...	56.70	15.10
Mahim Mandal	...	22	11	2	...	1	64.44	21.00
Mahammad Hosen		13	5	3	1	0	52.50	17.70
Osman Behara	...	13	19	16	11	1	69 30	15.10
Nanda Shaik	...	45	44	17	6	1	77.00	12.60
Gopal Mandal	...	8	20	4	2	2	76 70	14.00
Ram Ch. Dutta	...	18	26	10	...	2	79.70	16.30
Messer Shaik	...	3	5	2	1	...	58.30	14.00
Madan Fakir	...	29	35	17	6	...	60.90	14.00
Sonatan Mandal	...	14	20	19	2	...	57.80	22.10
Bahadur Mandal	...	23	25	16	4	2	69.30	18.60
Ganee Shaik	...	18	25	27	8	4	69.70	14.90
Begum Chang	...	34	32	11	4	1	65.30	14.90
Rasik L De	...	9	19	21	12	10	85.10	16.80
Kanai Shaik	...	25	33	11	3	...	60.60	13.00
Total	...	339	362	194	62	27		
Percentage	...	34.4	36.7	19.7	6.7	2.7		

The following tables show the effect of inunction of oil on the total amount of solids excreted.

1st Series.

	—March 14 Daily average of total solids. Grammes.	March 15—24. Daily average of total solids. Grammes.
G. C.	43·34	33·59
R. U.	34·98	30.15
M. M.	44·56	31 19
M. H.	44·50	25.85
O. B.	39·42	28.97
N. S.	49.27	31.69
G. M.	41.78	35·58

There was no rainfall on either of these two periods.

2nd Series.

	April 23—29 Daily average of total solids. Grammes.	April 30—9 May Daily average of total solids. Grammes.
G. C.	35.66	30.07
N. S.	27·59	31.60
R. Datta	32.04	31.06
O. B.	29.41	47.10
M. F.	34.00	37·27
S. M.	32.36	37·21
B. M,	34.00	37.85

G. S.	33.91	46.05
B. C.	32.31	30.02
R. De.	39.65	42.00
K. S.	27.57	30.48
Number of rainy days—Nil. Total amount of rainfall—Nil.		Number of rainy days—3. Total amount of rainfall—3.54″

3rd Series.

	April 27 to 3rd May Daily average of total solids. Grammes.	May 4—9 Daily average of total solids. Grammes.	May 10—13 Daily average of total solids. Grammes.
G. C.	24.03	23.08	27.17
N. S.	29.83	29.23	30.49
M. F.	34.34	36.42	29.47
B. M.	41.20	35.16	31.42
G. S.	35.35	39.41	40.45
B. C.	32.73	33.70	42.87
R. De.	50.74	48.67	49.37
K. S.	36.36	28.06	33.22
	Number of rainy days—3. Total amount of rainfall—1.70″	Number of rainy days—2. Total amount of rainfall—·2	Number of rainy days—4. Total amount of rainfall–1.99″

In the first series of observation seven men used oil on their persons in the way described before. Every one showed a falling off as regards the

average quantity of total solids passed by the kidneys. There was no rain during the period the men were under observation. During the second series of experiments, eleven were kept under observation. During the first period when no oil was rubbed, there was no rainfall. During the second period, rain fell for three days out of the ten during which the men used oil, the total amount of rainfall being 3.54″ inches. The amount of total solids instead of decreasing as in the first series, increased in the case of eight and decreased in the case of three.

The third series of observations is to be divided as before into three periods. The first period lasted for 7 days when no oil was used. In these 7 days rain fell on three, and the total amount of rainfall was 1.40″ inches. During the second period which lasted for six days, oil was rubbed on the skin. Although there were two rainy days, the amount of rainfall was only ·2″ inches. During the third period of four days oil continued to be rubbed on the skin as during the second period, but rain fell on every day, the total amount of rainfall being 1.99″ inches. Eight men were kept under observation during all these three periods. In the second period five showed a decrease while three showed an increase. During the third period six showed an increase and in two cases there was a decrease.

The conclusions that seem to follcw from the above figres are :—

1. That inunction of oil decreases the excretion of total solids from the kidneys.
2. Increased humidity increases the excretion of total solids passed in the urine.

1st Series.

The following tables show the influence of fish :—

	April 9—12. Daily average of total solids. Grammes.	April 13—22. Daily average of total solids. Grammes.
G. C.	37.96	37.59
M. M.	31.77	32.20
O. B.	43.57	43.84
N. S.	38.17	41.47
G. M.	47.42	43.47
R. De.	34.22	45.43
M. F.	34.80	37.27
S. M.	35.15	41.95
	Number of rainy days–3. Total amount of rainfall—2.19″	Number of rainy days–2. Total amount of rainfall—1.06″

2nd Series.

	May 10—16. Daily average of total solids. Grammes.	May 17—26. Daily average of total solids. Grammes.
G. C.	36.00	32.25

N. S.	41.22	33·43
M. F.	35.06	40.34
S. M.	34·10	39·54
B. M.	30 43	35·25
G. S.	37·91	46.95
B. C.	27.86	35·48
R. De.	41.10	49·41
K. S.	32.44	40.22
	Number of rainy days ... 4	Number of rainy days... 5
	Total amount of rainfall 3·76″	Total amount of rainfall 6.89″

3rd Series.

	June 14-21. Daily average of total solids. Grammes.	June 22 to July 3. Daily average of total solids. Grammes.
G. C.	28.58	31.27
N. S.	30.52	35·15
M. F.	27.63	38.08
G. S.	34.63	32.30
B. C.	31.85	35.46
R. De.	37.87	45.82
K. S.	33·10	36.49
	Number of rainy days ... 5	Number of rainy days ... 10
	Total amount of rainfall—2.69″	Total amount of rainfall—4.03″

In the first series 8 men were kept under observation. Six showed an increase one showed a decrease and in one there was neither increase nor decrease. During the first period there were three rainy days and the total amount of rainfall was 2.19″ inches. In the second period rain fell for two days and the total rainfall was 1.06″ inches.

In the second series, out of nine cases, six showed an increase while three showed a decrease. In the first period, rain fell for four days the total amount being 3.76″ inches. In the second period, rain fell for five days, the total amount of rainfall being 6.89″ inches.

In the third series, seven men were kept under observation, six showed an increase and in one the daily average of total solids showed a decrease. During the first period rain fell for five days, the total amount of rain-fall being 2.69″ inches, during the second period, rain fell for ten days, the total amount of rainfall was 4 03″ inches.

The conclusions that seem to follow from the above are that :—

1. The addition of a small quantity of fish increases the excretion of total solids with the urine.
2. The effect of humidity on the excretion of solids when fish is taken cannot be definitely stated, but it would seem that in-

crease of rainfall has a tendency to increase the amount.

In Europe the rainfall is more evenly distributed throughout the year, and the contrast between the different seasons is not so marked as it is India. In India the principal seasons are the hot and dry summer April, May, June ; the warm and damp rainy season July, August, September ; dry and cool (in some parts cold) winter and spring from October to March. The largest amount of water is drunk when it is hot and dry—but the excretion of urine is lowest during this period. When the rains set in, (and the transition is as marked as it is sudden) the amount of water drunk falls off, but the amount of urine excreted increases. During the winter, people drink the smallest quantity of water but they pass more urine than they do either in summer or during the rainy season. The transition from the warm and damp rainy season to the cold weather, it should be added, is slow and gradual.

Keeping in mind the vicarious action of kidneys and skin, the above may be interpreted as follows. The amount of water that escapes through the skin is greatest in summer, falls off during the rains, and is least in winter. The change however from the increased excretion from the skin, in summer to the partially arrested excretion in the rainy season, is sudden and marked. Within the

period of a week, the kidneys are called upon—to get rid of four or five times the quantities of water they had been doing during the previous three months. In the same way, the other substances solids and liquids, that escape from the skin increase or decrease in accordance with the season, and their increased and decreased expulsion from the system, throws proportionately additional or diminished burden on the other vicarious organs of excretion.

The following two tables show amounts of urine passed during the rainy days and on days during which no rain fell.

Table showing the effect of rain on the excretion of urine.

Name.	750 c.c. & under	Above 750 c.c. & under 1000	Above 1000 c.c. & under 1500	Abovn 1500 c.c. & under 2000	Above 2000 c.c. & Above 2500	Above 2500
Guru Charan ...	11	8	17	4	1	0
Rahamatulla ...	...	...	...	...	...	...
Mahim Mandal ...	...	1	4	1	...	...
Mahammad Hosen...	...	...	...	...	...	...
Osman Behara ...	...	1	7	2	...	...
Nanda Shaik ...	2	1	12	9	13	4
Gopal Mandal ...	2	1	1	1	1	...
Gani Shaik ...	2	7	11	10	5	1
Ram Ch. Dutta ...	...	1	6	2	1	...
Messer Shaik ...	...	...	...	2	...	...
Madan Fakir ...	1	8	18	11	1	...
Sonatan Mandal ...	...	4	6	8	...	...
Bahadur Munsi ...	...	4	5	10	5	...
Begum Chang ...	1	10	19	3	2	...
Rusik L. Dey ...	1	...	5	9	13	4
Kanai Shaik ...	4	9	7	9	4	...
Total ...	24	55	118	81	46	9
Percentage ...	7.2	16.5	35.4	24.3	13.8	2.7

Table showing effect of dry weather on excretion of urine during dry days and percentage.

Name.	750 c.c. & under	Above 7500 c.c. & under 1000 c.c.	Above 1500 c.c. & under 2000 c.c.	Above 2000 c.c. & under 2500 c.c.	Above 2000 c.c. & under 2500 c.c.	Above 2500 c.c.
Guru Charan ...	28	23	15	5	...	...
Rahamatulla ...	8	4	7	...	...	...
Mohim Mundal ...	7	8	9	6	...	...
Mahammad Hosen...	2	3	8	8	1	...
Osman Behara ...	6	24	15	5	...	...
Nanda Shaik ...	4	14	17	28	6	3
Gopal Mandal ...	2	5	20	3	...	...
Gani Shaik ...	7	17	17	4	...	1
Ram Ch. Dutta ...	2	5	18	19	2	...
Messer Shaik ...	3	...	2	2	2	...
Madan Fakir ...	6	14	19	9	...	...
Sonatan Mandal ...	...	5	19	11	2	...
Bahadur Munshi ...	5	7	22	9	3	...
Begam Chang ...	8	20	17	2	...	...
Rasik Lal De ...	3	7	11	10	7	1
Kanai Shaik ...	23	7	7	2	...	...
Total ...	114	123	223	123	23	5
Percentage ...	17·5	25·0	34·2	18·8	3·53	·7

So far as the quantity of urine is concerned the figures only confirm the daily experience of every body, but they do something more. Increased or decreased excretion of urine means, as mentioned before corresponding decrease or in crease in the work of other organs, influencing at the same time the quantity (and quality) of their excretion, which in their turn modifies the question of the general nutrition of the whole system.

As we have seen before, inunction of oil, or addition of a small amount of fish, to a vegetable diet, has very little effect on the excretion of urine compared to the influence of increased humidity. The former may modify it to a certain extent, but their share cannot be accurately ascertained.

The influence of humidity on the excretion of urea has been alluded to before. It would seem that increased moisture has the tendency to diminish the quantity of urea excreted by the kidneys When oil is rubbed on the body, excretion of urea increases but an increased humidity of the atmosphere exerts an opposite effect. The result is that the quantity of urea shows a decrease. Similarly when fish is added to a vegetable diet the quantity of urea increases. This increase is modified to a certain extent by an increase in the atmospheric moisture, but not to such an extent as in the case of inunction of oil.

As mentioned before, the effect of small doses

of Calomel was tried on a certain number of prisoners under conditions, similar to which fish and oil were tried. 8 men were kept under observation under ordinary jail conditions for 7 days, and the daily average quantity ef urine and urea passed was noted. Of these 6 men were given calomel for 9 days—the other two had been discharged from the Jail. The quantity given was ·04 grms. or 1—16th of a grain, given 3 times a day after meals. The following table will show the results so far as excretion of urine, urea and total solids are concrened.

Effect of Calomel on the excretion of urine.

	March 25-31. Daily average quantity passed. Grammes.	1·6 April. Daily average quantity passed. Grammes.
G. C.	957	8c6
M. M.	786	1044
O. B.	979	1181
N, S.	1300	1631
G. M.	1064	1247
R. D.	1400	1631

Effect of Calomel on the excretion of urea.

	March 25-31. Daily average quantity passed. Grammes.	April 1-8. Daily average quantity passed. Grammes.
G. C.	22·83	17·99

M. M.	14·43	14·59
C. B.	17·58	21·62
N. S.	15·87	17·45
G. M.	17·38	19·78
R. D.	17·25	19·28

EFFECT OF CALOMEL ON THE AMOUNT OF TOTAL SOLIDS PASSED.

	March 25–31. Daily average quantity of total solids. grammes.	April 1–8. Daily average quantity of total solids. grammes.
G. C.	40·37	31·03
M. M.	28·30	25·67
O. B.	33·60	37·55
N. S.	30·28	40·28
G. M.	36·24	37·22
R. De.	36·91	36 02

As regards the quantity of urine excreted, out of six cases five showed an increase. The quantity of urea increased in five cases and diminished in one; while the total solids showed an increase in three cases and diminished in three. The conclusions that the above tables seem to point to are, that Calomel given in small doses increases the excretion both of urea and of urine, but that it has no decided effect on the excretion of total solids.

SECTION VII.

Relation of animal food taken to urea excreted—Disproportionate increase of Nitrogen excreted—two theories of production of urea—conclusion—disproportionate diminution on discontinuance.

We have seen before, that the addition of a little fish increased the excretion of urea. That the elimination of urea should show an increase, on the addition of an animal food, to an otherwise purely vegetable diet, is what could only be expected, but the chief Physiological interest lies in the relative proportions between the amount of animal food taken and the quantity of urea excreted.

In the first series of experiment, one Poa or 226.4 grammes (8 ounces) of fish was thrown in the vegetable curry, cooked for the prisoners, whose numbers varied during the period from 34 to 40. The population of the prison during the ten days on which fish was tried was as below:—

April	12	13	14	15	16	17	18	19	20	21
	36	36	40	41	35	34	34	36	36	38

One Poa or 226.4 grammes (eight ounces) of fish represents 648 grammes or hundred grains of Nitrogen. Therefore during the ten days each prisoner got 2.76 grains or .179 gramme of Nitrogen per day from the fish that fell to his share.

	Average amount of urea passed when no fish was taken.	Average amount of urea passed when fish was taken.	Increase of urea.	Representing Nitrogen.
	Grammes.	Grammes.	grammes	Grammes.
G. C.	18.93	19.53	.60	.28
M. M.	16.00	17.24	1.24	.57
O. B.	19.50	19.09	—	—
N. S.	12.06	15.43	3.37	1.5
G. M.	15.63	19.26	3.63	1.7
R. D.	17.23	19.85	2.62	1.23
M. F.	19.17	19.67	.50	.23
S. M.	15.13	19.20	4.07	1.91

Taking the Formula of urea to be $CO(NH_2)_2$ each gramme of urea represents .47 gramme of Nitrogen. But looking at the increased amount of urea excreted, it seems that while each person got ·18 gramme of Nitrogen from his fish, the increased amount that each passed varied from .282 to 1.91 grammes per day.

In the second series of experiment, a comparatively larger quantity of fish—namely, 1814 grammes (sixty-four ounces)—was added to the vegetable curry of the general gang of prisoners. The following tables will show the details.

Population of the Jail during the time the men were under observation.

May	16	17	18	19	20	21	22	23	24	25
	48	54	36	36	35	31	34	34	38	40

Therefore each prisoner got on the average 1.7

ounces of fish equivalent to 21.25 grains or 1.38 grammes of Nitrogen.

	Average amount of urea passed when no fish was taken.	Average amount of urea passed when fish was taken.	Increase of urea.	Representing Nitrogen.
G. C.	18.35	22.75	4.40	2.068
N. S.	17.31	26.93	.62	.2914
M. F.	21.20	26.71	5.51	2.59
S. M.	16.37	26.40	10.03	4.71
B. M	16.69	19.63	2.94	1.38
G. S.	19.20	28.37	9.17	4.31
B. C.	13.84	15.82	1.98	.93
R. De.	20.40	26.59	6.19	2.91
K. S.	20.76	28.66	7.90	3.71

Taking .47 grammes of Nitrogen to correspond to one gramme of urea a glance at the last column of the above table will show the disproportionate increase in the elimination of Nitrogen as compared with the amount obtained from the quantity of fish taken.

In the third series of experiments the result was not so striking. Seven men were kept under observation for twenty days. 2 seers or 1814.4 grammes or 64 ounces of fish were thrown into the vegetable curry of the general gang of prisoners whose daily number averaged 50 during the period. Each man therefore got 1.28 ounces or 36.22grms. of fish representing 16 grains or 1.04 grammes of

Nitrogen. The following table shows the amount of increase in urea in each case :—

	Average amount of urea passed when no fish was taken.	Average amount of urea passed when fish was taken.	Increase of urea.	Respresenting Nitrogen.
	Gramme.	Gramme.	Cramme.	Gramme.
G. C.	18.56	21.82	3.26	1.53
N. S.	19.56	20.75	1·19	·55
M. F.	23.59	23.65	·06	·028
G. S.	21.54	23.35	1·81	·85
B. C.	13.49	14.69	1.20	·54
R. De.	24.27	24.62	·35	.16
K. S.	22.19	25.77	3.58	1.68

The increase was not so marked as in the previous experiments. It must be remembered that the monsoon had set in and as we have seen in the case of oil, sudden increased humidity has the effect of decreasing the elimination of urea. Still out of 7 cases, 2 showed an amount of increase which cannot be accounted for by the quantity taken in with the fish.

The question arises, where does the increased amount of Nitrogen come from ? Even admitting that all the Nitrogen contained in the fish was excreted in the form of urea, there still remains an excess of Nitrogen that is to be accounted for. As mentioned before during the period the men were under observation, so far as it was practically possible, steps were taken to ensure absolute uni-

formity in their food, drink and mode of life. The majority of the prisoners did not materially lose or gain weight. The changes have been noted in Appendix III. The slight fluctuations that were sometimes noted, even if the figures are to be accepted as correct, were the ordinary variations which every healthy man will show if periodically weighed, and they cannot be interpreted to mean any material interference with the general nutrition. The larger variations as mentioned before cannot be accepted as reliable.

There are two views as to the source of urea in the system.

1. Urea is an approximate measure of the degree of metamorphosis, of the Protein compounds going on in the body (Bischoff).
2. Urea is mainly derived from the disintegration of the Nitrogenous constituents of the food. "97 per cent or more of the Nitrogen consumed in the food is eliminated by the Kidneys in the form of urea" (Parkes).

Without entering into any discussion as to which of the above 2 theories is correct, it would be safe to admit that urea is derived from both the above sources, and the fact may be regarded in the light of floating account and fixed deposit. The disproportionate increase in the elimination of Nitrogen can be explained by the hypothesis

that the Nitrogen was derived either from an increased metamorphosis of the protein compounds of the body or it was obtained from the Nitrogenous elements contained in the other constituents of the food or from both. The conclusion therefore may be fairly drawn, that fish, even in very small quantities, added to a rice diet, increases either the metabolism of the Nitrogenous tissues of the body or it helps the transformation of the vegetable albuminoids contained in the other articles of diet. For our purpose strictly speaking, it is not necessary to speculate as to the share, each of the above two factors contributes to the increased production. Having recognised the broad fact, that the addition of a very small quantity of fish, is a nutritive help to the system, we are concerned with the consideration of the effect, on the system of the abrupt withdrawal of oil and of this small quantity of animal food from an otherwise purely vegetable diet.

On *a priori* grounds, it may be presumed that such a procedure will be followed by a diminished excretion of urea, testifying to impaired metabolism of the tissues as well as to the imperfect transformation of the Nitrogenous elements of food. As seen before, the figures confirm the statement, that such is actually the case. Only two series of experiments were tried. In the first series, out of nine cases, on stopping fish, five

showed a decrease ; in the second series, out of nine, the urea diminished in seven. The decrease is not so general as the increase but the difference is significantly disproportionate to the amount of Nitrogenous food taken.

SECTION VIII.

Food of the prisoners—nutritive value—examination of Parke's theory—examination of the older theory—total quantity of solids excreted as a test—fate of the Nitrogen ingested—conclusion.

We may now turn to a brief consideration of the food of the prisoners and examine it in the light of the results obtained from the experiments. Roughly speaking the following constitutes the ordinary diet of a Bengali prisoner.

Rice	26 ounces	733·6 grammes.
Dhall	6 ounces	169·8 „
Vegetables	6 ounces	169·8 „
Oil	2 drachms	7·7 „
Salt	1 „	3·8 „
Tamarind	2 „	7·7 „

The main sources of Nitrogen therefore are the rice and dhall. Taking sixteen ounces or 453·6 grammes of rice to represent sixty eight grains or 4·606 grammes of Nitrogen (Letheby) the daily

ration of rice represents 110·5 grains of Nitrogen. Deducting 25 per cent of nutriment as wasted on account of the water in which it is boiled being thrown away, the amount of available Nitrogen that can be obtained from the rice can be put down as 83 grains or 5.38 grammes. Taking sixteen ounces or 453.6 grammes of dhall to yield 248 grains or 16·0904 grammes of Nitrogen, the daily ration of 6 ounces or 169.8 grammes will correspond to 93 grains or 6.02 grms. of Nitrogen. Both combined therefore, will yield 176 grains or 11.4 grammes of Nitrogen. As ·47 grammes of Nitrogen represents 1 gramme of urea, 11·4 grammes of Nitrogen ought to ensure an elimination of about 25 grammes of urea per day. If we take Parke's estimate to be correct, that 97 per cent or more of the Nitrogen consumed in the food is eliminated by the Kidney in the form of urea, then we ought to have a daily excretion of about 25 grammes of urea from the food that a prisoner consumed every day.

The following table given before, but reproduced here for ready reference, will show what I actually got as a result of examination of 984 specimens.

Table of quantities of Urea passed by each man

NAME.	Under 10 Grammes.	Above 10 and under 15 grms.	Above 15 under 20 grms.	Above 20 under 25 grms.
Guru Charan ...	4 3.55 p.c.	22 19.6 p.c.	32 28.5 p.c.	31 27.67 p.c.
Rahamatulla Sheik ...	1	5	8	4
Mohim Mandal...	1	21	11	2
Mahomed Hosein	3	11	7	1
Osman Behara ...	1 1.66 p.c.	15 25 6 p.c.	24 40.0 p.c.	14 23.3 p.c.
Nanda Shaik ...	8 7.08 p.c.	30 26.6 p.c.	24 43.4 p.c.	20 17.7 p.c.
Gopal Mandal ...	1	8	16	9
Gonee Shaik ...	2 2.44 p.c.	10 12.2 p.c.	22 26.8 p.c.	20 24.4 p.c.
Ram Ch. Dutt ...	5 8.93 p.c.	6 10 71 p.c.	26 46.42 p.c.	17 30.36 p c.
Messer Shaik ...	2	2	5	1
Madan Fakir ...	1 1.15 p.c.	11 12.6 p.c.	18 20 7 p.c.	34 39.1 p.c.
Sonaton Mandal .	1 1.81 p.c.	13 23 64 p.c.	21 38.18 p.c.	34 21.8 p.c.
Bahadur Munsi...	2 2.85 p.c.	9 12.65 p.c.	25 35.7 p.c.	18 25.71 p.c.
Begam Chang ...	10 12.2 p.c.	45 54.9 p.c.	19 23.2 p.c.	6 7.32 p.c.
Rasik L. Dey ...	0	7 9.9 p.c.	13 18.3 p.c.	20 28 2 p.c.
Kanai Shaik ...	0	5 6.95 p.c.	22 30.55 p.c.	20 27 67 p.c.
Total ...	42	220	317	229
Percentage ...	6 26 p.c.	22.5 p.c.	32.2 p.c.	23.2 p.c.

and individual and general percentages.

Above 25 Grammes.	Minimum	Maximum	Amount of urea they should have passed according to Bischoff's Calculation. Lowest.	Highest.
23 / 20.54 p.c.	9.25	25.49	18.46	29.93
1	8.22	26.40	18.79	30.48
1	10.86	31.20	16.80	27.24
0	10.86	21.74	17.62	31.27
6 / 10.0 p.c.	10.40	33.97	17.11	27.76
7 / 6 2 p.c.	8 00	34.40	19.63	31.84
2	8.22	40.29	19.30	31.29
28 / 24.01 p.c.	8.23	38 57	22.99	37.28
2 / 3.56 p.c.	8.80	30.71	18.29	29 65
1	5.20	41.14	......	......
23 / 26.5 p.c.	10.80	44.75	17.85	29.12
8 / 14.5 p.c.	10.57	34.74	17.11	27.76
16 / 22 85 p.c.	8.40	35.66	17.11	26 12
2 / 2.44 p.c.	7.71	29 83	17.28	28 03
31 / 43.6 p.c.	11.43	41.60	22.15	35.92
25 / 34.72 p.c.	14.17	46.86	19.30	31.29
176 / 17.8 p.c.				

Parke's statement however requires some explanation, before it can be discussed. If 97 per

cent or more of the Nitrogen consumed in the food is eliminated by the Kidneys in the form of urea, then we would expect that a man, whose diet included 100 grains of Nitrogen would pass at least 97 grains of Nitrogen with his urea. This is of course unlikely, as it does not make any allowance for loss from non-digestion or non-assimilation. Putting therefore a modified interpretation on the statement, it can only mean, that if the food containing nitrogen be completely digested and assimilated, then 97 per cent of the Nitrogen will appear in the urea with the urine.

If Parke's conclusions are to be admitted in their modified form as generally correct, and if we examine the figures obtained by actual experiments in the light of that statement, the next question that would arise would be as to what becomes of the food elements for which a corresponding elimination of urea cannot be, obtained. If the food that a man takes is expected to ensure an elimination of 30 grammes of urea and we actually find that he passes only 20 grammes of urea, what becomes of the Nitrogenous food elements, which if assimilated would ensure an elimination of the missing 10 grammes ?

Such a question admits of two likely replies :—

1. The food passes out of the bowels in a more or less undigested state or that,
2. The peptones or modified proteides are not

completely split up in the Liver into assimilable products and urea, but a part of them passes out of the liver into the general circulation where they are transformed into constructive materials either of the tissues or of the secretions, notably bile.

It is difficult however, to accept the first hypothesis as strictly or even generally correct. We have seen that in the food of the general rice eating population of the country, that although there is some what less Nitrogen than in the Jail diet, yet the constituents, as well as the quantity are practically indentical with prison food. It is hard to believe that millions of people, most of whom are abjectly poor, have been from time immemorial taking food, from a quarter or third of which they derive no nutritive benefit, and to admit that every time they take their food, their digestive energies are devoted to ensure a condition of inevitable indigestion. The dejecta from the bowels in the case of a vegetable eating animal, are always greater than that of a carnivorous animal, but beyond that, the examinations of the stools of the prisoners, did not reveal any undue proportion of undigested food materials.

That the ultimate products of the disintegration of food elements are eventually expelled from the body there can be no doubt. Otherwise the men will die from the effects of the presence of a

large mass of partially digested food or from the indirect effects of auto-intoxication. This is far from being the actual case. The Prisoners in the Jail, at least all of them do not seem to suffer ; many maintain good health, and a fair proportion of them even increase in weight during their forced abstinence from fish. The Hindu widows, whose case has been mentioned before, maintain remarkable good health with their vegetable diet, although it is a noteworthy fact that a large proportion of them, as much as 60 per cent, do ultimately die from Diarrhœa and Dysentery.

We are constrained therefore to conclude that if we accept the view, that urea results mainly from the disintegration of Nitrogenous food elements, then, in the case of the Bengali prisoners (and presumably of the general rice eating population) the products of disintigration of Nitrogenous food elements in the radicles of the Portal Vein, are not completely split up in the Liver into assimilable tissue-constituents and urea, but that some of them pass into the general circulation to be further modified into formative material, to be utilised otherwise than in direct tissue building.

We may now turn to the older theory of the production of urea that "the amount of urea is an approximate measure of the degree of metamorphosis of the Protein compounds going on in the body." If this theory is accepted then the increase

and decrease of urea, depending on the addition or abstraction of fish (or other animal food) means one or two things. Taking the old example, let us say that a man passes 20 grammes of urea under a purely vegetable diet. He passed 30 grammes of urea with the same diet to which an inconsiderable amount of fish had been added. If the increased urea following the use of fish is due to increased Nitrogenous tissue waste, what happened when the man did not take any fish?

Leaving aside the view that the food represented by the missing Nitrogen passed out of the bowels in an undigested state, two things are likely to happen :—

1. Either there is arrested Nitrogenous tissue waste,
2. Or the products of tissue waste are not completely oxidised, but are in part utilised in the system in some other way.

It will be going beyond the object of the present papers to try to trace the factors that lead to increased tissue change, but a rough idea may be formed from the results of weighment and from the evidence furnished by the amount of total solids passed with the urine. The following table shows the weights of the men during the periods when fish was added to their food, and that immediately before it, when their food consisted of Rice Dhall and Vegetables only.

Weight of the Men before and after Eating of Fish.

			G.C	M.M.	O.B.	N.S.	G.M.	R. Dutt.	S.M.	M.F.	B.M.	G.S.	B.C.	R.D.	K.S.
			lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs
1st. Time.	Nil	10-4 04	113	99	101	117	115	115	102	—	—	—	—	—	—
	Fish	24-4-04	117	101	102	114	115	115	100	—	—	—	—	—	—
2nd. Time.	Nil	8-5-04	117	—	—	114	—	—	100	118	97	143	107	118	130
	Fish	15-5-04	116	—	—	115	—	—	100	114	97	142	104	116	128
	Fish		115	—	—	114	—	—	98	118	99	144	106	117	129
3rd. Time.	Nil	12-6-04	113	—	—	116	—	—	—	116	97	142	101	115	129
	Fish	1-7-04	115	—	—	118	—	—	—	116	98	144	104	115	127
	Fish		114	—	—	114	—	—	—	119	96	134	106	116	127

The figures cannot be accepted, however, as correct. The method and apparatus for weighing were extremely primitive, and such fluctuations as of 3 or 4 four pounds in a week or ten days without any apparent cause or without leaving any sensible result, are more than suspicious.

A better test will be the amount of total solids passed day by day during the periods the men were under observation. The results of observations have been already given.

We have seen before that the amount of urea increased generally speaking on each of the occasions that fish was given but the fact that is of special significance is that the increase in solids was greater than what can be explained by the presence of increased urea. We cannot therefore be wrong if we conclude that the addition of fish to a rice diet is followed by evidence of increased tissue change and its abstraction is followed by diminished tissue waste.

The other alternative and this brings us to the second of the two Hypotheses with which we started is that withholding fish from rice diet does not necessarily mean a partial arrest of tissue change, but that the products of tissue change are not expelled from the system in the form of urea ; they are used up in the system in the formation of secreting fluids such as bile etc. We cannot be wrong if we admit the possibility of this happening

if we try to account for the disappearance of Nitrogen from the system.

The waste products of Nitrogenous food elements may escape from the bowels undigested. We have seen before, that it is highly unlikely that a large section of Human Population has adopted a system of diet, from a considerable portion of which they derive no nutritive help. When the digested Nitrogenous food elements enter the radicles of Portal Vein, we know, urea appears in the Hepatic Vein, proving that the Liver is the principal organ concerned in its elaboration. The urea that is elaborated, is filtered from the blood by the kidneys. We have seen that the amount of urea that is passed on a rice diet cannot account for the large proportion of Nitrogenous elements contained in the food. Of the two other channels of excretion, the Lungs can get rid of a very minute fraction of the Nitrogenous tissue waste. From 1/100 to 1/50 of the amount of Nitrogen is supposed to escape from the Lungs and it is very doubtful if even this very small quantity is derived from the food. It is true that several of the organic substances that pass through the Kidneys such as Uric Acid, Urates of Sodium and Ammonium can escape from the Lungs, but the quantity is extremely minute, and it is doubtful whether any escape takes place under ordinary normal conditions. The amount of urea that escapes from

the skin, may be regarded as a negligible quantity. So that following this excluding process, we come to the conclusion that if we accept the older theory of the production of urea—that the Nitrogenous waste products are mainly expelled in shape of urea from the Kidneys,—a part is utilised in the body in the secretions containing Nitrogen and the Nitrogen finally got rid of with the secretions or their products.

We have seen above that the other theory about the formation of urea leads to the same conclusion as to the ultimate fate of that portion of Nitrogenous food elements which can not be accounted for by the amount of urea excreted.

SECTION IX.

Effect of imperfect transformation of Nitrogenous elements of food—in the bowels—in the Liver—in the blood—summary—connection with Dysentery—breeding stage of a disease—Cholera Epidemic—breeding stage of Dysentery—influence of the Liver—connection between the activity of the Liver and the excretion of urea—connection between ingestion of food and Dysentery—corroborative evidence connecting Dysentery with food.

We have seen that the addition of a small

quantity of fish to a practically entirely vegetable diet is followed by an increased excretion of urea, and its discontinuance is marked by a diminution, the increase and decrease being greater that what can be accounted for, by the amount of Nitrogen, contained in the small quantity of fish. We may shortly notice, what will likely be the effect on the system of the imperfect transformation in the intestinal canal or in the Liver of the Nitrogenous elements of the food or of imperfect metamorphosis of the Nitrogenous tissue.

They may be grouped generally speaking under the following heads :—

1. The accumulation in the intestinal canal of imperfectly split up and imperfectly digested food elements, acting as a direct irritant to the mucous membrane of the intestinal canal.

2. The products of the imperfectly transformed Nitrogenous food elements may find their way into the radicles of the Portal Vein and arrive at the Liver in a condition fit to be transformed by that organ into assimilable matrix for tissue formation and urea, or

3. The Liver may be incapable for some reason to split them into normal products of proteid metabolism leading to

4. Accumulation in the system of the product of imperfectly metamorphosed Nitrogenous food elements.
5. The last mischief being aggravated when there is imperfect metamorphosis of the Nitrogenous tissues as well.

Taking the first of the above possible contingencies, it may be stated, that a mass of semi-digested food is capable of setting up irritation of the mucous membrane against which it comes in contact, is a common enough occurrence, but it is against all experience that such bland materials, such as boiled starch—which boiled rice and dhall chiefly consist of—can and habitually does set up irritation by any local action. They can do so however, if for any reason, the mass is decomposed or fermentation sets in it. Now, the principal agent in preventing such putrid or fermentative decomposition is the natural intestinal antiseptic—bile. If therefore for any reason, the secretion of bile in the intestinal canal is interfered with, there is a corresponding risk of the ingested material to act as a direct irritant to the mucous membrane of the digestive tract.

If however in the bowels, the Nitrogenous food elements are imperfectly digested or such decomposition does take place, the products that would result, are some forms of Peptones or Ptomaines. It is true that Ptomaines have been excreted with

the urine but normally the function of the Liver is to split up the products of disintegration of the Nitrogenous food elements, if they are absorbed by the radicles of the Portal Vein, into inoccuous components before either Peptones or Ptomaines can reach the general circulation. Both these conditions imply extractivity of the Liver.

The third contengency, namely the inability of the Liver to split up the products of partially transformed Notrogenous food elements into normal products of Proteid Metabolism, can only take place if for any reason the activity of the Liver is impaired. The main factor in diminishing the activity of any organ or tissue is the accumulation in its substance of the products of its own functional activity. Both the conditions mentioned above necessitate extra activity of the Liver and under certain almost inevitable conditions will lead to over-stimulation, with the result that the functional activity of the organ, for the time being at least, will be partially arrested. The fourth and fifth conditions, namely accumulation in the system of the products of imperfectly metamorphosed Nitrogenous food elements or imperfectly metamorphosed Nitrogenous tissue waste will naturally follow, if the elaborative activity of the Liver is interfered with. The presence of Uric Acid in the blood due to a somewhat similar cause is a familiar example. There is no reason however, to suspect

that in the case of the prisoners who have been deprived of fish or in the case of those who take very small quantities of fish, there is an undue accumulation in the blood of partially oxidised organic substance such as Uric Acid, Xanthin, Hypoxanthin, Kreatinin. Still the ultimate fate of a portion of disintigrated Nitrogenous product is to be accounted for. We have seen in the last section that the most satisfactory explanation is, that they are ultimately utilised in the formation of some of the secretions of the body, notably the bile before being finally disintegrated and expelled from the bowels. This again implies increased activity of the Liver, for such metamorphosis is effected by the agency of that organ.

We may now summarise the effects of use of fish, and its discontinuance on the human system in case of persons living on a rice diet.

1. A small quantity of fish, added to an otherwise entirely rice diet, increases the elimination of urea.
2. The Nitrogen corresponding to the excess of urea that is passed is greater in quantity than the Nitrogen contained in the amount of fish ingested.
3. The sudden withdrawal of the small amount of fish diminishes the quantity of urea eliminated, the diminution representing an amount of Nitrogen greater than what was

contained in the fish.

4. As the chief sources of urea are :—

   (*a*). Disintegration of the Nitrogenous food elements, and

   (*b*). Metamorphosis of the Protein compounds of the body ;

The addition of fish, increases the assimilation of Nitrogenous food elements, and at the same time, increases the metabolism of Nitrogenous tissue ; and

5. The withdrawal of fish diminishes the assimilation of Nitrogenous food elements and also diminishes the metabolism of the Nitrogenous tissues, causing thereby

   (*a*). An accumulation in the Hepatic Vein of a comparatively larger collection of imperfectly metabolised Nitrogenous food elements and

   (*b*). An accumulation in the blood of products of imperfectly oxidised Nitrogenous tissue waste—both conditions thereby

6. Throwing more work on the Liver, and necessitating an increased activity and thus making it susceptible to

7. Exhaustion on account of accumulation of the products of its own functional activity producing the familar condition known as torpidity of the Liver.

8. The accumulation in the blood of the products of imperfect Nitrogenous tissue waste, acts as a poison to the nervous system, producing in the first instance irritation of the nervous system, and if continued, ultimately weakening the disease-resisting power of tissues.

How are the above to be connected with the production of Dysentery?

The last link in the chain of causation of Dysentery and very likely of other diseases, in the present state of our knowledge, leaving the question of toxins aside, is the microbe. The appearance of microbe can be accounted for in two ways. Either by direct introduction through the medium of food or drink, charged with them, or by the propagation by a comparatively few organisms into a colony, in a suitable nidus. Celli and Fiocca have produced all the symptoms of this disease by injecting artificial culture of the Colon Bacillus into an otherwise perfectly healthy Colon. Here the independent influence of the seed is predominent.

On the other hand two of the commonest causes of Dysentery in this country, are, eating of unripe fruits, and a chill in the abdomen. Europeans who in this country habitually wear a belt made of flannel, or of some similar stuff over their abdomen, as a protective, against chill are particu-

larly liable to attacks of Diarrhœa, Dysentery or even Cholera, if for any reason they are unprovided with their protective bands.

The obvious explanation why Dysentery and the other diseases mentioned above are produced by two such seemingly dissimilar causes, such as eating of unripe fruits and catching a cold is that the resisting power of the tissues concerned—in these cases the mucous membrane of the bowels—diminishes and it therefore directly and indirectly offers a suitable breeding place for the microbe. Here the soil is the predominating factor. In the case of eating of unripe fruits, the undigestible mass acts as a local irritant to the tissues against which it comes in contact and for the time, renders them too weak to resist the invasion or multiplication of the microbes. In the other case the sudden congestion (or anaemia) produced by the chill, leads indirectly to the same result. In both the cases, a condition of least resistance is produced with the ultimate result, that the changed tissues offer a favourable nidus for the growth of the specific germs of certain diseases.

The formation of a breeding stage for particular germs is familiar to everyone who has watched cases in a Cholera Epidemic. After the first few cases in an Epidemic of Cholera, the interval between the Diarrhœa and Cholera stages grows not only marked, but gradually becomes more

prolonged, and the fact is well known to every Physician that if the preliminary diarrhœa can be checked the disease may be prevented to develop into the more serious malady.

During the period that the Epidemic rages the precautions that are recommended to be taken are directed against the production of Diarrhœa or that weakened condition of the bowels that has been alluded to before. In the case of Cholera we have two links of the chain before us. The irritation (or the particular condition) that produced the Diarrhœa—and the Diarrhœa that changed into Cholera. We have first the Diarrhœa with all the symptoms of the familiar disease, but if it goes unchecked, the stools become more watery—assume the characteristic rice-water appearance—vomiting appears—cramp follows—suppression of urine sets in, and the fatal malady is before us, fully developed with all the dreaded symptoms. At the commencement it was Diarrhœa. It has given rise to another disease—Cholera.

In time as the Epidemic gets older, the interval between the Diarrhœa and the Cholera stages becomes more prolonged and finally for reasons which we cannot ascertain at present, the transition from the one to the other ceases, and we recognise that the Epidemic is over.

In the early part of the Epidemic the preliminary stage is very short, sometimes impercep-

tible. It is quite conceivable that either the germs entered the system in a sufficient number to dispense with the stage of multiplication or, that the transition from one disease to the other is so rapid that the interval between the two is practically nil.

In the case of Dysentery as in the case of Cholera, the causes that produced the initial weakness of the tissues, which as a result, harbour and favour the multiplication of specific germs may be numerous and varied. After what has been already said, it need hardly be repeated that practically speaking, in the vast majority of cases, it is the Liver that is primarily and chiefly at fault before the initial disturbance can be followed by a specific disease.

Without entering into any discussion on the subject, we may accept the generally recognised opinion that the excretion of urea is an index of the activity of the Liver. Experiments have proved that "some drugs which increase the quantity of bile in dogs in a state of nitrogenous equilibrium *e.g.* Sodic Salicylate and Benzoate, Colchicum, Mercuric Chloride and Eounymin, also increase the urea in the urine." (Noel Paton). Similar results have been obtained by other observers, we can therefore admit the intimate relations that the excretion of urea has with the activity of the Liver.

On the other hand it is certain, that urea is the chief end product of the metablism of the proteids.

Decreased production of urea means decreased activity of the Liver. It follows therefore, that decreased activity of the Liver or its torpidity means the poisoning of the system with imperfectly oxidised proteids. One result of the diminished activity of the Liver is an alteration in the quantity (and very likely in the quality) of bile, the natural purgative and antiseptic of the intestinal canal. On the one hand we have a systemic poisoning and on the other, a local weakness caused by the withdrawal of the natural purgative and protective agent namely the antiseptic bile. The result of this is that a *Punctum Resistentiae Minoris*, a weak spot is produced which offers a suitable nidus to, (and possibly invites the introduction of) specific germs.

In has been seen that by withdrawing fish from the food of men who were in the habit of using it a vicious circle is established. We have on the one hand, a Liver stimulated to elaborate the Nitrogenous products of digestion and transform the products of partially metamorphosed Protein compounds present in the blood, on the other hand, we have a food and mode of living which are fruitful sources of bringing about both the above conditions.

The circumstances that favour the causation of Dysentery may therefore be summarised as follow:—

Loss of resisting power of the tissues of the intestines against the propagation or multiplication of microbes. This impairment of

resisting power may be brought about.

1. By direct action of the ingested food on the mucous membrane of the bowels.
2. By the presence in the blood of poisons, which are most probably due to defective disintegration of the Nitrogenous elements of food and imperfect metamorphosis of the Protein compounds of the tissues.
3. By the alteration in quality or quantity of the biliary secretion which is the natural purgative and antiseptic of the intestinal canal.

The last two conditions are produced by the so-called torpidity of the Liver which is produced in its turn, by the exhaustion of the organ due to:

1. Increased elaborative efforts to assimilate improper food, and
2. Increased activity to metamorphose the partially oxidised proteids in the blood into harmless products or useful constituents of normal secretions.

Can any corroborative evidence be adduced to confirm that it is the changed food that is mainly responsible for the production of Dysentery? I think it can be done. Of the 536 cases admitted into the Jail Hospital at Mymensing the following table shows the cases according to the interval that elapsed between their admission into the Jail and attack of Dysentery.

Interval between admission into Jail and admission into Hospital.

	Under 15 days.	Above 15 days and under 1 month.	Above 1 month & under 2 months	Above 2 month & under 3 months.	Above 3 month & under 4 months	Above 4 month & under 5 months.	Above 5 month & under 6 months	Above 6 month & under 1 year	Above 1 year under 2 years.	Above 2 years.
Total.	81	77	90	60	46	39	27	63	4	2
P. C.	16.6	15.8	18.4	12.2	9.4	7.9	5.5	12.9	.8	.4

There could not be possibly any other cause. The brick-built, dry, airy, double-storied barracks, where the prisoners lived were palaces compared to the low, damp, straw-thatched mud hovels, where they lived in their own homes. With the exception of one or two buildings, the Jail was the best house not only in the town but in the whole district. The food was not inferior in quality to what they had been accustomed outside. The quantity as we have seen was not scanty and there could be no risk of underfeeding. The water which they drank, in which their food was cooked, and what they used for ablution, could not possibly be responsible for their disease. It was obtained from a fairly broad running stream, filtered through the usual filter beds before it was distributed by means of wrought-iron pipes. The same water was supplied to the town and Dysentery was scarcely known among the general population. Bacteriological examination never succeeded in detecting any special presence of disease germs. In their own homes the sources of drinking water are muddy and polluted streams, ponds or ditches and the idea of associating disease with dirty water never troubled their minds. Drainage, conservancy and all other sanitary measures were all that money and skilled science could effect.

If we look at the figures of the above table we shall find that it is the comparatively new comers

that were the greatest sufferers. Out of the 488 cases (I cannot get the particulars of the 48 cases from where I am writing) 81 or $\frac{1}{6}$th (one-sixth) of the total number got Dysentery during the first fortnight of their admission, nearly a third before the end of the first month, and fully half before they put in two months of their periods. After that, gradually toleration set in, and the system adapted itself to the changed factors of nutrition.

We are in a more favourable position now, to answer the questions with which we started in the beginning. In the light of what we have seen in the previous sections, it is intelligible why Dysentery should be more common in Jails. The little fish which formed a part of the food which the men took in their own homes, and inunction of oil to which they had been accustomed, had nutritive value to the system. By interdicting both the nutritive equilibrium is disturbed. To secure a fresh equilibrium or in other words to effect an adaptation to the new surroundings and to the altered factors of nutrition, additional work is thrown upon the Liver. The abrupt demand for the increased activity of the Liver to meet the altered conditions is the cause of that organ being thrown out of order. Dysentery is the consequence of the derangement of the Liver.

SECTION X.

Relation between the excretion of urea and of urine—the excretion from the skin and its Physiological import—relation of Dysentery with use of oil—with the increase of humidity—explanation of the systemic disturbance noted in the first section—domestic remedies employed.

We have seen before that one of the effects of addition of small quantity of fish to an otherwise purely vegetable diet has a tendency to decrease the quantity of urine excreted. If this is taken in conjunction with the fact, that under simliar conditions the quantity of urea shows an increase, then we can draw the inference, that when less urea is excreted, the blood retains something, probably some less oxidised form of tissue waste, which acts on the nerves producing as one of the effects, increased excretion of water from the Kidneys.

The following table shows the relative amount of urea and urine passed by the prisoners who were kept under observation. Only such men have been taken who were kept under notice, uninterruptedly for over 50 days. On the whole, it will be seen that speaking generally, those that passed less urine, passed comparatively more urea and *vice versa*.

Comparative Statement of Elimination of Urine and Urea.

Name	Less Urine or 1000 cc & under. Per cent.	More Urine or above 1000 cc. Per cent.	More Urea or 20 Grammes & above. Per cent.	Less Urea or 20 Grammes & under. Per cent.
G. C.	62.50	37.50	48.21	51.79
O. B.	51.70	48.30	33.13	66.87
N. S.	18.60	81.40	23.90	76.10
R. Datta.	14.64	85.36	33.92	66.08
M. F.	33.80	66 20	65.60	34.40
S. M.	16.36	83.64	36.30	62.70
B. M.	22.85	77.15	48.56	51.44
B. C.	47.50	52.50	9.76	9c.34
G. S.	40.20	59.80	58.14	41.86
R. De.	15.46	84.54	71.80	28.20
R. S.	59.70	40.30	57.39	42.61

That the influence of nerves, determines the quantity of water passed is a familiar phenomenon. Hysteria, Diabetes, so called Nervousness, all produce copious and frequent micturition. On the other hand, the complete suppression of urine in Cholera, cannot be wholely explained by the abstraction of water, from the blood. That there is something present in the blood, which ultimately regulates the quantity of water passed, will be generally conceded. In our present state of know-

ledge we cannot determine or isolate it, but there can be little doubt of its existence.

It has been seen before, that inunction of oil has an effect similar in some respects to the use of fish. The amount of urea eliminated increases while the quantity of urine diminishes. In a previous section the effect of rubbing of oil on the skin has been discussed. The conclusions which the results of experiments point to, seem to be that when oil is rubbed on the skin :—

1. There is greater excretion of water from the skin.
2. There is greater excretion at the same time of products of tissue waste from the same source, consequently the blood is comparatively free from Nitrogenous and other waste products, thus :—

(*a*) Throwing less work on the Liver and
(*b*) Causing less irritation to nerves.

The opposite condition prevails when the use of oil is discontinued and the effect is likely to be more pronounced in proportion as the transition is more sudden.

The normal cutaneous secretion consists of the secretion of the sebaceous and sudoriparous glands and hair follicles. A certain amount of water also escapes probably by transudation. A certain amount of Carbonic Acid Gas variously estimated

at ($\frac{1}{50}$th) one fiftieth to ($\frac{1}{30}$) one thirtieth of the pulmonary exhalation, escapes from the skin.

The secretions from the sebaceous glands and hair follicles consist of Epithelial cells, Oily and Extractive matters. The secretions from the sudoriparous glands, consist of water Acetic, Butric and Formic Acids, urea and salts (chiefly Sodium and Potassium Chloride) and a little fatty matter. The quantity of urea or of Extractives that escapes from the skin, in 24 hours is however very minute.

How oil used in the way described before, keeps the skin clean, the openings of the glands more open and helps in this way the escape of cutaneous excretions has been described before. One more effect may be briefly noticed here. If oil is absorbed as oil or fat in the system, then the discontinuance of the practice will throw extra work on the Liver to render ingested fat, fit for assimilation. If the oil that is secreted by the sebaceous glands is obtained from the blood and if the blood receives fat directly from the skin and there is very little doubt that both these happen, then it is intelligible how this supply of fat from the skin being cut off, more fat must pass through the intestines or less oil should be secreted by the sebaceous glands.

The importance of keeping the skin perfectly clean, so that its natural excretions would find the

readiest means of egress, will be better realised if we recall the well-known Physiological fact that if the skin be covered with an impermeable varnish or the body be enclosed in a caoutchouc bag, the head alone being left out, the animals soon die as if asphyxiated ; the heart and lungs being engorged with dark blood and the temperature falling by several degrees. It is to be specially remembered that while an animal will live for many hours and even days after the total suppression of urine, if the excretory functions of the skin be seriously interfered with, the fatal result invariably follows within very few hours.

Recalling what we have seen in a previous section, that inunction of oil increases the excretion of urea from the Kidneys it will be not difficult to trace the relation of Dysentery with the use of oil. In the case of individuals, who are in the habit of using oil on their persons, the skin gets rid of a certain amount of excretion. When the inunction of oil is stopped, a part of the excretion cannot escape through that channel, the result is they collect in the blood.

They cannot however continue as such in the blood for a long time, or collect indefinitely, otherwise the individual will die from the effects of auto-intoxication. There can be only two ways in which they can be finally disposed of :

1. Expelled from the system by means of some other channel.

2. Transformed into some inocculous constituent to be utilised in the human economy before their final excretion, in some other form.

In short, we come back again to the same condition which we discussed before, in trying to trace the relation of Dysentery with the use of animal food. So long as the waste products collect in the blood, the result will be the same, as what we can expect from the presence of an irritant poison, and it will follow naturally that the more abrupt the interference with the work of the skin, the more marked will be the symptoms of irritation.

A few words only will be necessary to re-call the effect of increased humidity on the system. We have seen that increased humidity or in other words increased dampness of the weather has the effect of :—

1. Diminishing the excretion from the skin and of,

2. Diminishing the excretion of urea.

The effects of inunction of oil or of taking of fish with a rice diet, so far as excretion of urine and elimination of urea are concerned, are practically neutralised by increased dampness of the weather. If we refer back to the results of the third series of

experiment with oil on the excretion of urea, we shall realise to what extent, increased dampness interferes with the elimination of urea. In the course of four days, the daily amount excreted decreased by 8 or 10 grammes and in one case it fell from a daily average of 22.85 to 8.53 grammes. In the case of ingestion of fish, the amount of urea eliminated, increases but the increase is not so marked as it would be, if the weather was dry. The obvious corollary that will follow from the above two facts, may be summed up by saying :—that in case of increased humidity of the atmosphere, there is a correspondingly increased accumulation in the blood of waste products, and at the same time there is a corresponding diminution of the functional activity of the Liver. We have seen before what relation these facts bear to the causation of Dysentery.

It will not be surprising therefore, if we find that cases of Dysentery should show an increase during the rainy season. In appendix No. IV has been given a comparative statement of numbers of cases of Dysentery, treated according to months, in the Khulna Dispensary for 5 years. It may be added that the proportion holds generally good for other districts of Bengal.

With reference to the excretion of solids, the conclusions are not so clear. We have seen that the use of oil on the skin, diminishes the amount

of total solids excreted from the Kidneys, so long as the weather is dry, and that increased humidity increases the excretion of total solids although oil is rubbed on the person. We have also seen that one of the results of the addition of a small quantity of fish, is to increase the excretion of total solids with the urine. This is not affected by increased dampness of the weather. To understand the significance of the above it should be added, that more than half the total solids in the urine are contributed by the urea present in it, and that urea increases with the addition of fish and inunction of oil, and that increased humidity has the effect of diminishing the elimination of urea.

It will be obviously impossible to formulate any general law, from the above perplexing and complicated groups of facts. One broad conclusion may be deduced from them, and that is, increased humidity is followed by the appearance in the urine of a large amount of inorganic material. The significance of this fact will be more readily realised, if we remember that damp weather produces torpidity of the Liver.

We may now return to the examples of systemic disturbances which we referred to in the first section. The first we saw, was the case of giving up of fish by Hindu Widows, and the digestive disturbances that almost invariably followed such a procedure. The symptoms complained of generally

are Dyspepsia, Constipation, Diarrhœa, and Dysentery.

It may be said, that fish used in such small quantities as few drachms or ounces per head, is useful only as a flavouring agent, and that its withdrawal renders the food insipid, and Dyspepsia and the other symptoms are the consequences.

This view cannot however be maintained. That fish added to a vegetable curry can modify its taste there can be no doubt. But that fish is used as a flavouring agent like spices, is not known in this country. People eat fish, fried or boiled, unmixed with vegetables—a thing they never do with spices. On occasions, when they can get it, they eat a large quantity—as much as a pound or more at one time—an amount one does not associate with the consumption of spices. Besides, as seen before, the amount of fish experimented with both in the Mymensing and Khulna Jails, although variable in quantities were very small, and did not in the slightest degree modify the taste of the curry. And lastly we have seen the effects of the addition and abstraction of even a microscopic quantity on the excretion of urea—or what is the same thing—on the functional activity of the Liver. We can now understand why such symptoms are almost bound to follow. All of them point to functional inactivity of the Liver and we have seen how this torpidity is brought about.

The second example is equally easy of explanation. A man is in the habit of using oil on his person ; he has to give it up abruptly. In addition to that, he has to give up at the same time the eating of fish, to which he had been hitherto accustomed. The symptoms that follow are, irritation of the nervous system as shown by sleeplessness, itching of the skin, irritation of the genito-urinary systems causing frequent, scanty and high coloured urine—some amount of sexual excitement, irritation of the bowels as evidenced by constipation, scanty stools, tenesmus, mucus and bloodstained stools. The symptoms are those that would naturally follow from the presence in the blood and the circulation, of some irritant material which acts directly on the organs and tissues and partly those, that would follow from the functional inactivity of the Liver.

The third example of similar symptoms following on the change of clothing worn next to the skin, from light, thin and porous cotton, to more closely woven, comparatively heavy and impermeable silk stuff, is equally easy of explanation. In the former case, the escape of the normal excretions from the skin, was uninterrupted and free. In the latter case, the excretory function of the skin is seriously interfered with. The silk in short, behaves in a way similar, though not to such a pronounced degree, as the impermeable varnish referred to before. The

retention in the blood of waste products, hitherto escaping from the skin, is abundantly proved by the nervous symptoms, such as headache and giddiness. The gastric disturbances that follow, are specially interesting, as they indirectly corroborate the conclusions we arrived at, as the result of experiments. Here there is no alteration in the quality or quantity of food. Still, constipation, Diarrhœa and Dysenteric symptoms follow, testifying to the Hepatic disturbance caused by the circulation in the blood of unoxidised waste products.

The fourth example needs but a brief notice. During the hot and dry months of summer, the skin acts actively. The excretions escape more freely than at any other season. With the sudden onset of the rainy season, the monsoon as it is called, which although a regular phenomenon, is always sudden, there is an abrupt change in the humidity of the atmosphere. How it affects the system, can be gathered from what has been said before on the subject. The excretions hitherto eliminated from the skin, cannot escape so freely as before. The symptoms of langour of mind, heaviness of the limbs, and general lassitude of the body are, the natural results of the presence in the blood, of waste products. Torpidity of the Liver naturally follows and the gastric disturbances are the inevitable consequences.

An allusion to the remedies adopted by those that suffer from these conditions may be of interest. The Hindu widows resort to a larger consumption of fruits, milk or ghee (clarified butter). During the period of mourning, those that suffer from the effects of the imposed restrictions, resort to the same device. Sherbats (subacid drinks) are generally relied upon in the case of *Urdha* or *Rukha*. It will be seen that these expedients with the exception of butter have the effect of increasing the activity of the Liver. Milk and butter are taken for their laxative effect—milk in the constitution of the Bengalis has a purgative and not a constipative action.

In this connection, it is of special interest to note that shortly after the monsoon breaks, and at a time which generally coincides with the first outbreak of heavy rains, for the period of four or five days,—Ambu-bachi as it is called—the Hindus not only abstain from animal food but practically live on milk aud fruits. The experience of ages has crystallised into an ordinance which is religiously respected and whose expediency and sound ness, science will not hesitate to endorse.

SECTION XI.

Dysentery among British Troops—action of the skin in the Tropics and in a Temperate Climate—food of British Soldiers and Officers in the country—summary of the causes at work.

An instructive side-light will be thrown on the questions, if we glance briefly at the subject of Dysentery among British Troops in India.

The following table will show that not only Dysentery is more common among British Troops, but the proportion of fatal cases is greater than among Indian Prisoners in Jail. Why should it be so ?

Following a parallel line of arguement we would expect to find evidence of causes at work, which are likely to produce derangement of the Liver. That is, as we have seen before, one of the effects of an abrupt increase of its activity. This demand on the Liver is likely to take place if the system is called upon to establish under changed conditions, a nutritive equilibrium or in other words, if the system is to adapt itself to a sudden and violent change in regard to some of its nutritive factors.

What happens to the system of a British Soldier when he first comes to this country ? The two organs on which extra work is thrown are, the skin and the Liver. If they are equal to the demands that are made on them, there is no chance of any

Comparative Prevalence of and Mortality from Dysentery.

Disease ...	European Army of India.								Native Army of India.			Jail Population of India. 114,334	
	Men 60540				Women 2555		Children 4700		Present 124,231 Enrolled 142,886			Admission	Death.
	Admission.	Constantly sick.	Death.	Invalids.	Admission.	Death.	Admission.	Death.	Admission.	Death.	Invalids.	—	—
Dysentery...	1238	86·91	42	55	44	1	86	9	5,720	48	14	11,019	586

or 7·83 death per 100 European "Men."

or 1·08 per 100 Native Army.

or 5·31 per 100 Jail population.

Annual Report by the Sanitary Coommissioner with the Government of India 1902.

systemic disturbance. But the change from a temperate climate like that of England, to the Tropical Climate of India, puts both the organs at a disadvantage.

Let us take the case of the skin first. In his own country he has to keep his skin covered with warm and fairly heavy clothing. This is necessary for two objects :—

1. To protect the body from the surrounding cold atmosphere.
2. To preserve the body heat.

The temperature of the air that immediately surrounds his body, that is, the air within the meshes of the clothes and between the clothes and skin, is generally within a few degrees of the normal body heat. The skin is not called upon to adapt itself to any violent fluctuation of temperature. There is no need for it, as his clothes come between the external air and the skin. Consequently the skin does not acquire the power. One result is, that even when he comes to the Tropics he has to put on comparatively heavy clothing as a protection against the external air.

A comparison with a Bengali Agriculturist (a class which corresponds with that of an agricultural labourer in England) will give a better idea of the significance of the fact mentioned just now. From March to October he seldom puts on any covering above the waist either when he works

in the fields or in his own home, during the day or at night. The temperature of the air that comes in immediate contact with his body, varies from 85° to 150°F. All the variations between these two extremes he bears, without the help of any protective covering. The skin kept scrupulously clean and in the very best of conditions by inunction of oil and daily baths, accommodates itself automatically to the fluctuations of the temperature, as well as to the alternate scorching and drenching, on account of exposure to the sun and rains.

In the next place, in the case of the British Soldier in his own country, the excretion of water from the skin and all that is held in solution is considerably less than in the Tropics. We have seen before that in a cold country the Kidneys excrete far more water than the skin. In India and very likely in the Tropics generally, the skin is the principal agent in getting rid of water for a considerable portion of the year. This extra work is thrown on his skin when a British Soldier first comes to this country. It has to adapt itself within a short time to the changed conditions. But the structure of his skin and the mechanism of adaptation are according to the requirements of a coid country. Compared with a Bengali Agriculturist he is at a considerable disadvantage thereore, when he comes to this country.

The followiwing is a list of a Soldier's daily food in India. All these articles he gets free.

'SCALE OF RATIONS OF BRITISH SOLDIERS AT ALL STATIONS IN INDIA.

1 lbs. 453.6 grms. Bread	$\frac{5}{7}$ ozs. 20.2 grms. Tea or $1\frac{2}{7}$ozs. (40.42 grms.) Coffee.
1 lbs. 453 6 grms. Meat (Mutton on Sundays, Beef on weekdays)	$\frac{2}{3}$ ozs. 18.86 Grms. Salt.
4 ozs. or 113.2 grms. (Rice or Flour). 2½ozs. or 70.7 grms. of Sugar.	1 lbs. 453.6 grms. of vegetables or Potatoes 12 ozs. (329.6 grms.) and other mixed vegetables

Breakfast.	Dinner.	Supper.
Tea	Steak or Stew	Tea
Bread & Butter	Vegetables	Bread & butter
Eggs, etc.	Bread	
	Rice pudding.	

Generally, he supplements the above with the addition of Eggs, Fish, Butter and Fruits, purchased out of his own pocket. In England his ration consists of one pound or 453.6 Grammes of bread and one pound or 453·6 Grammes of meat, the rest he has to buy at his own expense. It will be seen that in coming to this country, he

certainly gets more to eat—and generally speaking as a matter of fact, he does eat more than he does in his own country. Articles of food are cheaper in this country and he has more money to spare.

The above list comprises his food, all the year round, Summer and Winter.

Let us see what his work is from March to October.

Early Parade for an hour or for an hour and a half in the morning, generally from 6 to 7-30. A.M.

From 9 to 10 or 10-30 A.M. some other lighter form of duty, such as Fire Exercise or attending a Signalling Class.

Another hour of work from 11 to 12, in the shade and not requiring any Physical work, such as attending a lecture, finishes his day's work. There are of course occasionally other duties, such as ordinary Fatigue or Sentery Duty, but the above is usually the daily routine.

If we compare the food of a British Soldier with that of a Bengali Agriculturist, or of a Bengali Prisoner we notice, that the nutritive value of a British Soldier's daily food is more than double of that of the latter. It is to be admitted that the British Soldier is the heavier man of the two, but still neither the weight of his body, nor

its requirements can be double of what they are in the case of a Bengali. It is also to be kept in mind, that the work of a Bengali peasant is much more exacting than that of the soldier. All the year round he is engaged in the hardest of all works, namely field work. From April to June he is busy with his Ashu Crops—from July to December with *Haimanti* Crops—and from January to March with the *Rabi* Crops.

The case of British Officers is scarcely better. Take the case of a young Subaltern of 20 or thereabouts, who has come to the country for the first time. Something like the following will be the number and nature of his daily meals :—

Chota Hazri or early breakfast—early in the morning—generally a cup of tea and a toast or a Biscuit.

Breakfast at 9 consisting of 4 to 5 courses—fish, meat and vegetables.

Lunch between 1 & 2—of 4 to 5 courses—chiefly hot and cold meats.

Dinner at 8 P.M.—consisting of 6 to 7 courses.

As a curiosity, I give in Appendix No. VI. the bills of fare of all the meals for 4 days of a British officer in a Regiment, stationed in the Fort William, Calcutta. For obvious reasons, I do not enter the name of the Regiment or the year in which it was stationed there. I may add that com-

pared to many Regiments, the bills of fare will not appear extravagant or even unduly liberal.

It may be said, that the officer does not take of every thing that is placed before him. Without entering into any discussion on the subject, it may be generally stated, that a Spartan severity or a Monastic austerity is not the prevailing tone of a British Officers' Mess and the younger the Subaltern is, the less likely is he to do anything that may look like eccentricity or may invite attention, at the mess table.

Let us compare the above with the daily food of an Oxford Under-Graduate. I am indebted to the courtesy of an Oxford Graduate for the following.

Breakfast at 8 A.M. ...	A couple of eggs and toast and butter—1 common of butter is about half ozs. (14.1grms.) Jam or marmalade. Instead of eggs sometimes fish or occasionally a Chop or Steak weighing about a quarter of pound (113.2 grms.)
Lunch at 2 P.M. ...	As a rule a roll and butter; sometimes cold meat bread and butter.
Tea at 4-30 P.M. ...	Tea and Cakes, dry fruits.

Dinner at 7 P.M. ... Soup or Fish, one Entree such as a piece of Croc-quet or Cutlet, a couple of slices from a joint and vegetables. Few take sweets.

On the above food the Under-Graduate takes hard Physical Exercise every day for 2 to 4 hours according to the season. It will be seen therefore that the young British Officer not only eats more than is necessary but considerably more than what a young man of his age and rank eats in his own country.

It is a common saying that in the Tropics the Liver is much more active than in a colder climate. The Physiological significance of such a statement, is not very clear. It is supposed, although there is no positive proof to support it, that in the Tropics not only is the Liver more active, but that one of the results of its activity is a greater secretion of bile. The bile by virtue of its excrementitious function, acts vicariously to the lungs, and thus removes from the system, much of what escapes with the expiration, in a Temperate Climate.

The amount of exercise which either the Officer or the Soldier can take in this country, from the nature, of the climate, cannot be as hard or even of the same nature as he can take in his own country. So that neither of them has the benefit

of an important source of excretion, or of an equally important agent of oxidation, both of which can be secured only by vigorous Physical Exercise.

In the case of the European, there is generally another factor that has an important bearing on the question at issue—namely the use of stimulants. Alcohol stimulates the functional activity of every organ—temporarily. The digestive system with the auxilliary organs in common with the others, is equally if not more seriously affected. It means additional stimulation of the Liver.

All these conditions examined in the light of what has been previously stated, are enough and more than enough to bring on that state which is most likely to produce Dysentery. It may be added that the same causes of auto-intoxication and Torpidity of the Liver are also mainly and primarily responsible for the production of a more serious disorder, namely Enteric Fever.

There is the presence in the blood of a large amount of waste products from Nitrogenous food elements, there is also the disadvantage of a skin, unaccustomed to meet the demands of a Tropical Climate, throwing thereby more work on the Liver as the chief elaborative organ, and finally there is the serious drawback of a nervous system, affected not only on account of the above two cases, but also by the direct action of Alcohol.

Summing up what has been already said it may be stated, that a young English Officer or Soldier on his arrival into this country suffers from the following disadvantages :—

1. The skin is called upon abruptly to take up work, for which neither its structure nor the mechanism of adaptation, is as perfect as they both are in the case of an inhabitant of this country.
2. In the second place, more work is thrown on the Liver on account of the quantity and nature of the food. The mischief arising from both the above causes, is aggravated by the fact that the climate of the country does not permit him to take as much Physical Exercise as he is used to, in his own country or what will be necessary for the proper oxidation of the waste products or their elimination from the lungs.
3. Thirdly there is generally if not always an additional stimulation (apart from what is owing to the quantity and nature of food) of the digestive organs and of the nervous system from Alcohol.

SECTION XII.

General remedies in use for treatment of Dysentery —Castor Oil—Ipecacuanah—Bael—Sulphate of Magnesia—Izal—symptoms of disease—general treatment—state of urine in Dysentery—low specific gravity—its import—administration of Calomel—Rationale of the treatment.

Hitherto we have studied Dysentery in its Physiological aspect. In the concluding section I mean to see, if a Clinical study of the disease will throw any light on its etiology.

It will be easy to enumerate at least (200) two hundred drugs, of mineral or vegetable origin, found in nature or produced synthetically, which have been tried and found useful in the cure of Dysentery. Classifying them according to the action they are intended to produce, most of them generally fall under either of two heads, namely astringents and antiseptics. Some of the drugs such as Castor Oil, Magnesium Sulphate fall under a third class, as they are given for some specific action on the mucous membrane or the blood vessels. I give below a short account of such of the principal drugs, that I have a personal experience of.

A dose of Castor Oil at the beginning is almost the invarible rule in the treatment Dysentery. I may state that in the treatment of over 500 hundred

cases, in the Mymensing Jail Hospital, it was not given to a single patient. Excepting in children, where small doses frequently repeated are particularly useful, I have not found its administration called for. In many cases its disagreeable smell and taste are real and serious obstacles ; its reputation of possessing a soothing effect has not been found in my experience to rest on any proved fact, while in some cases at least, I had reason to suspect, that its administration was followed by needless and undesirable irritation. Occasionally in the course of the disease, the motions turned hard, although copiously covered with mucus and blood. In such cases one or two drachms (7·7 grammes) of Olive Oil in emulsion, frequently repeated, generally had a laxative effect.

Ipecacuanah is *Par Excellence* the remedy for Dysentery in the Tropics. When commencing practice, I had an opportunity to give it a large trial and found it fairly successful. The routine treatment of Dysentery, a few years ago, consisted of a dose of Castor Oil, followed by large doses of Ipecac Powder generally 20 grains (1·2 grammes) at a time. I should mention here that the patients on whom I tried this treatment—chiefly Sepoys, Indian Soldiers were big and strong men. A serious drawback to the treatment, was the nausea and uncontrollable vomiting that followed the administration of large doses of Ipecac. A preliminary

dose of Laudanum failed in many cases to keep them in check. I found drop doses of Chloroform given immediately before, the most effective preventive. In the Jail and also among out side patients, I found a quarter of a grain (·0162 gramme) of Ipecac Powder, prove a valuable adjunct to a quarter of a grain (·0162 gramme) of Calomel. In some cases even this small dose produced Nausea and Vomiting.

Bael (Aegle Marmelos) is another favourite Indian remedy. The Indian method of using it is generally successful, specially in chronic cases. A green Bael (Ripe Bael acts as a laxative) is roasted but not burned or charred overnight, and the pulp is given in the morning with a little sugar. A particularly useful form of using it in the cases of infants, suffering from Chronic Diarrhœa or Dysentery, is to throw in the milk, dried chips of the green Bael fruit (called in Bengal—Bael Sunto) and then boil the milk gently and for a short time before its use with some farinaceous food. The chips are of course removed from the milk when it is given to the child.

Sulphate of Magnesia given in large doses, specially at the beginning, has generally the effect of removing the blood from the stools. The effect appears to be chiefly mechanical, and temporary. The profuse watery discharges that follow, seem to me an additional drawback against its use

specially in the cases of weakly and broken down patients.

My experience with Izal, has not been so favourable as it has proved with others. In simple cases it does very well but in severe and obstinate cases I had to change it invariably for Calomel.

The symptoms that the men presented when they came into the Hospital, which was generally in the evening, were, constipation and some amount of griping. There was almost always a history of Dyspepsia and want of appetite, and general malaise, during the previous 3 or 4 days. In the course of the night, the men developed the usual symptoms of Dysentery, and their condition in the morning, presented all the familiar symptoms, characteristic of the disease. Blood and mucus were invariably present, with thin, scanty and frequent stools : in some cases the stools consisted of very little else. Tenesmus was almost an invariable symptom, so was griping which was generally referred to, round the navel. Urine was scanty and frequent. In severe cases, fever was present, the temperatnre rising generally between 102° and 103°.

Strict rest was enjoined in every case. Whether the mechanical irritation caused by the up-right position or movement, increased the internal irritation it cannot be said, but any movement, always seemed to aggravate the symptoms. The abdomen was always kept protected, by a warm belt

extending well up to the chest, and reaching below, to the pubes. Moist fomentation and turpentine stupes relieved the abdominal pain, while warm poultices over the abdomen, frequently changed, were as grateful as they were found to be useful. Sago and milk were generally the diet given, while *Dahi* or whey formed a refreshing drink.

If the inactivity of the Liver or its torpidity, be at the root of the mischief, then we would expect to find, some indications of it, in the urine. If the amount of urea be an index to the activity of that organ, then its inactivity, will be reflected in some degree in the urinary excretion. I have given in appendix No. V a list of thirty cases of Dysentery, in whom I tested the urine for urea. I should add here, that the urine was of patients who were not under my treatment. The samples were sent to me from a neighbouring Jail—Jessore—and the total amount could not be collected in every case. With reference to the results of examination, there are a few points to which I would like to refer shortly.

The total quantity of urine passed, during twenty four hours in many cases, seems to be very small, in some it appears to be suspiciously small. As I said before, the men who formed the subjects of observation, were not under my charge, and every one would recognise the difficulty of collec-

ting the urine of men, suffering from a disease, like acute dysentery.

The amount of urea entered in the tables, for the same reason, cannot be taken to be, the absolutely correct quantity, passed during the preceding 24 hours. There was another factor that introduces a fresh conflicting element, namely, some of the men suffered at the same time, from increased temperature. Those, whose specific gravity, was over 1025, come under this head. The third factor, that renders the figures still more unreliable, is the fact, that the Jail where the prisoners lived, is situated in a notoriously malarial district. So that, no definite conclusion can be arrived at, from the amount of urea estimated, whether the quantity was entirely due to Dysentery, or there was some other factor responsible for its production.

The point that I would however specially refer to, is the specific gravity of the samples of urine. It should be stated, that, there was no risk of the samples decomposing when they reached my hands, as the Jail was distant only a couple of hours Railway Journey, from Khulna, where they were tested. There were only 28 samples available to test the specific gravity. In 6 cases the specific gravity was 1005, and in 11 cases, out of the 28, it did not rise above 1010. In 4 cases only it was between 1020 and 1025, and in 6 cases it went above 1025. As mentioned before all the cases

that showed the high specific gravity, had fever. All the samples were tested for Albumin, none showed any. So far as possible it was ascertained, that the usual causes, that produce a low specific gravity, such as, drinking of a large quantity of water, or the presence of Bright's disease or Polyurea were absent. The readings were taken with an ordinary urinometer such as are graduated according to marks of .2 divisions. Any inaccuracy of reading could not therefore amount to more than 1 or 1.5 point.

The question may be asked, as to what is the Pathological significance of this (generally) unusually low specific gravity.

The specific gravity of a sample of urine, depends upon the proportion of solids it contains. The solids are contributed, both by organic and inorganic substances, present in the liquid menstruum. Roughly speaking, urea contributes nearly half, Sodium Chloride somewhat less and the rest are made up of various organic and inorganic matters. If we are not prepared to accept the estimate of urea, as given in the tables, to be correct for 24 hours, from a glance at the low specific gravity, we may conclude that the quantity of urea, shows a tendency to decrease, in cases of Dysentery. Remembering the connection of the activity of the Liver, with the formation of urea, we have here a corroborative

evidence that torpidity of the Liver is closely connected with the production of Dysentery.

In treating the cases, the method of treatment, that I found uniformly successful, was to give a quarter of a grain (·0162 gramme) of Calomel with two grains (·1296 gramme) of Sodium Bicarbonate three or four times daily, and to commence the treatment directly after the admission of the patients into the Hospital. In favourable cases, the stools showed the presence of bile after two doses, or even one, but as a rule generally 12 hours after, there was a copious discharge of bile, the colour varying from a rich golden, to nearly green. Blood and mucus did not disappear at once, but the appearance of bile, was a sure sign, that unless the system was broken down or any serious complication arose, recovery was assured.

In some cases, in the course of the disease, constipation set in, the stools containing at the same time blood and mucus. As mentioned above, the administration of small doses of olive oil, generally removed the difficulty.

In many cases, after the disappearance of Dysenteric symptoms, an obstinate form of Diarrhœa set in. Bismuth and the time-honoured Dover's powder generally kept it in check. In obstinate cases $\frac{1}{20}$th (one-twentieth) of a grain or ·00324 gramme of Argenti Nitras, with a quarter of a grain of Opium generally sufficed to stop it.

What is the *rationale* of the Calomel treatment?

The administration of Calomel is followed by the presence of bile in the stools. It is supposed to cause the secreted bile to be more rapidly moved on and prevent its re-absorption.

Calomel is also supposed to be a disinfectant of the Intestinal contents, either by itself, or by its transformation in the Intestinal canal, into Mercuric Chloride.

We have seen before in section VI, the results of experiments, with minute doses of Calomel. The elimination of urea increased in nearly every case in which Calomel was administered.

Putting all these together, it will be intelligible, why Calomel should prove so beneficial in curing, Jail and other forms of Dysentery. If Dysentery be due primarily and mainly, to the torpidity of the Liver, and if generally speaking the appearance of the microbes, and their resulting action, be the next link in the causation of the disease, it will be quite intelligible why a drug—which increases the activity of the Liver (as proved by the increased elimination of urea during its administration), which prevents a too rapid reabsorption of the natural antiseptic bile, and which may have antiseptic properties of its own,—will meet generally speaking, all the requirements for a successful treatment.

The exceptions will be in cases where the system cannot re-act against the initial, or secondary effects of the poison even when the latter is neutralised or rendered inoccous by treatment—in other words where the constitution is shattered, or where the complications, prove more dangerous than the initial disease.

I may conclude, therefore, by saying that the remedy was adopted on the assumption that the disease was due to a certain cause, and the results obtained from treatment seem to lend support to the theory.

APPENDIX I.

THE CONDITION OF THE PEOPLE.

The medical need of any district cannot be properly gauged without a clear understanding of the material condition of the people. In this connection a pamphlet drawn up by Mr. F. H. B. Skrine late of the Indian Civil Service, (The material condition of the people of Bengal) and published by the Anglo Indian Government, is of special interest. Mr. Skrine served almost entirely in Bengal and drew up his memorandum, after nearly 30 years of service in the Province. His remarks are of special value, as he was for many years at Chuadanga, a Sub-Division of this District. Speaking of the Central and Western Districts of Bengal (Nadia belongs to the former) he says "all classes are well fed and indulge in a display of clothing and jewellery which their fathers never dreamt of." Speaking of the Nadia District he says (P. 8) "the average ryot holds 3.3 to 5 acres and makes a net profit of 144 Rupees..........." The second class of farmers is represented by one, holding 13·3 acres with nine mouths to feed. The third class is by far the most numerous—the holdings vary from 7 to 8 acres" (P. 26). At another place he lays down that "five acres is the lowest area com-

patible with comfort," and concludes with a comparison between the English masses and the Bengal ryots, in which the happier lot of the Bengal ryot is painted in glowing terms, more however from a Phsychological, than an economic point of view.

In spite of the somewhat apparent inconsistency of some of the above statements, from the general tone of his writings, it would appear that if the land is not actually over-flowing with milk and honey, the people who live on it, enjoy certainly an abundance of good food and other necessaries of life. This, I believe, is the Anglo-Indian Official version.

It will be going beyond the scope of the present report to enter into the subject at any length. When speaking of the occupation of the population of the district, it has been seen that fully 50 per cent of the entire population or over 8 lakhs (eight hundred thousand) of men, women and children live directly by agricultural pursuits. Of these 8 lakhs it may be laid down that fully 66 per cent or ⅔rd do not enjoy the luxury, so far as quantity is concerned, of the food that the inmates of the District Jail obtain.

Mr. Skrine based his opinion on the condition of the people of this district upon informations collected in connection with 200 families. I give below a table (omitted here) showing a classification of the area of holdings in case of 2662 families

taken from various parts of the district. Of these 2662 1533 hold *Khas Mohal* lands or land held directly from the Government *i.e.* the Zemindar is the Government. The others namely 1129, hold their lands from Zemindars. Of the 2662 holdings, 1817 or 68 per cent own 5 Bighas or under and those holding 10 Bighas and above five Bighas constitute 15 per cent of the total. That is of 2662 holdings taken at random, 83 per cent of the holders till land measuring 3.3 acres and under. Those that hold 20 Bighas and above, are generally joint families, *i.e.* the brothers or uncles and nephews live together with their families and cultivate the land collectively. This joint family rule is almost universal in the cases of holdings of 50 Bighas and above.

How does the ryot live on such holdings ?

In the district Jail at Krishnagar it costs on an average Rs. 2-8 a month to feed a convict. This sum does not Include any expenditure for house, furnitures, clothes, beddings, medicines or social obligations. Taking all these, another 8 annas can be safely added to the above 2-8, to enable a ryot to live outside the Jail and enjoy the same amount of food as a convict. Taking the average number of inmates per house, to be 6, and resolving the children and those under age to the scale of adults, it may be put down, that it requires 12 rupees a month or 144 rupees a year to enable a ryot and

his family to live up to the standard of a prisoner. The average income per Bigha in this district, taking the summer and winter crops, is 10 rupees and that is taking a liberal view. Deducting Rs. 1-8-0 for the Zemindar, the net income would be 8-8-0 per Bigha. It would require a holding of something like 16 Bighas for each house-holder to enable the inmates to enjoy the same amount of food as a convict gets in the Jail. The scale of the diet of the convict has been calculated on a purely Physiological basis. It is a corresponding amount of potential to produce a certain amount of kinetic, and to this end, the coarsest materials that represent the potential have been laid down as his food. We have seen above that 83 per cent of the ryots cultivate 10 Bighas and under and that 68 out of these 83 till 5 Bighas and under. In America in its agricultural parts, it is laid down that for a man to live as a man, the minimum area of holding should be 20 acres or 60 Bighas.

It is quite true that many of the Indian royts who cultivate 5 bighas and under, have other pursuits besides the tilling of the soil. But when it is remembered that every form of indigenous trade and industry is daily dwindling and disappearing, the additional sources of income are at least as precarious as they are growing inadequate. The condition of the lower castes of the Hindu, if anything, is more deplorable. Every Hindu caste it need

hardly be mentioned is more or less a trade guild. A little consideration will show, that for a village smith, oilman, weaver, barber etc., there is very little chance even of making a competence by following his ancestral pursuits. After all, their customers or patrons are the village folks among whom they live and the general ruin that marks the condition of these latter, must follow them necessarily. There is a certain amount of fusion going on at present and people are forsaking their hereditary pursuits and taking to new occupations, but the effect is as yet unappreciable so far as the bulk of the people is concerned.

The condition of the Mahomedans to a certain extent is comparatively better than that of the Hindus. The immediate possession of the land is passing almost exclusively into the hands of this class. Unlike the Hindus they have always stuck to the soil. This was inevitable in the old days. A Hindu who became a convert to Mahomedanism had to leave his caste, or trade guild. There was nothing else for him but the land to take to. The decay of all indigenous trades has ruined the Hindus, who had mainly their trade or profession for subsistance, but it has affected but very little, the Mahomedans who had land to look forward to for their food.

There is nothing analogous to the agricultural classes of India with those that cultivate land in

England. The minute sub-division of land that has taken place in this country, and which act X of 1859 and the more recent Bengal Tenancy Act will still further help to perpetuate, and as time goes on, to accentuate, has no parallel in England. Even in Ireland where small holdings are not unknown, the average area is considerably larger than what it is here. The only class of people in Great Britain with whom the Bengal Ryot can be compared to, are the agricultural labourers. Whatever the apparent difference may be, a little consideration will show, that a Ryot after all is an agricultural labourer, and very little else. It is to be remembered that capitalist agriculture is not known in this country, nor under the system enforced by the British rule, is it practically possible ; so there can be no question of profit on capital laid out. The payment of the rent, profit or no profit is inevitable and the balance after paying the rent is really the equivalent of his wages for his personal labour on the land. Where unskilled labour is employed, as sometimes it is done such as for digging, and clearing Jungles, the rate of remuneration is 5 annas a day. It means Rs. 10 a month or Rs. 120 a year. I have shown before, that, that is more than what can be obtained from a farm of 10 Bighas.

A further consideration will show, that there is much in the lot of the British Agricultural labourer which the Indian Ryot has reason to envy.

Take the case of the most backward agricultural labourer in the British Isles, namely the Irish agricultural labourers.

If the property on which he lives, belongs to a rich man, the cottages are generally built upon an approved model. The old class of tenements are fast disappearing. Even when they are not built on any approved plan; the Board of Guardians of the various Unions, can and generally do exercise the powers conferred upon them under the provisions of several Labourers Acts 1883-1901. There are frequent sanitary inspections, and the defects are either removed, or the men leave where other things being equal, better accommodation is procurable. Every cottage built by the Board of Guardians, has attached to it the statutory half acre of land. In addition to that, small gardens are farmed from the farmers and in the rural areas the old conacre potato land is still a common and substantial adjunct to the agricultural Labourer's resources.

As for the food enjoyed by the British Agricultural Labourer and the Bengal Ryot the following tables will give some idea.

ENGLAND.

Weekly wages £1 1 0

Weekly Expenditure.

	s.	d.
Bread and flour	4	0
Meat	4	6
Butter	1	0
Cheese	0	8
Bacon	1	0
Sugar	1	0
Tea	0	6
Lard	0	8
Fire and oil	2	0
Salt and Pepper	0	4
Tobacco	0	4½
Soap	0	6
Rent	2	0
	18	6½

P.—84 Royal Commission on Labour.
The Agricultural Labourer Vol. I England.

BENGAL.

Name Azimmuddi	Area of holding 5¼ bighas.
Village	Quantity and value of produce per year.
Thana Chuadanga	Rice 9mds. @ Rs. 3 per mds. Rs. 27 0

Sub-Divn.- Chuadanga Rabi crop 6mds. at Rs. 2 8
District Nadia per mds. Rs. 15 0

Total 15mds. Rs. 42 0

Man, wife, 1 son (8), daughter (11).

Monthly budget.

			Rs.	As.	P.
Rice	...	$2\frac{1}{2}$mds.	7	8	0
Dal	...	$\frac{1}{2}$md.	1	4	0
Salt	...	$2\frac{1}{2}$ seers	0	4	0
Oil	...	$1\frac{1}{2}$ seer	0	10	6
Spices, Vegetable, Fish			2	0	0
Clothes			1	0	0

Total Rs. 12 10 6 ₩ month.

Precarious earnings.

Wages as Labourer ... ordinary 25 Rs. (about)
Ditto during
Harvest season ... 10 „ (about)

35 Rupees.

Name—Fazl Karikar area of holding $10\frac{1}{2}$ bgs.

Man	...	...	1
Wife	...	...	1

Brothers	... ...	2
One brother's wife	...	1
Daughter (9)	...	1
Son (12)	...	1
		7

Quantity of produce per year and value.

Rice 20mds. at Rs. 3 per mds. ...	Rs.	60	0
Rabi Fasl 13mds at Rs. 2-8 per mds.	„	32	8
Total 33mds.	„	92	8

MONTHLY BUDGET.

	Rs.	As.
Rice $3\frac{1}{2}$mds.	10	8
Dal $\frac{1}{2}$mds.	1	14
Salt	0	8
Oil	1	0
Spices, fish, vegetable	2	0
Clothes	1	8
Total ...	17	6

Precarious sources of income.

There is a loom in the house on which the different members of the family work.

Average annual earning ... Rs. 75

Comment on the above is useless.

The Physique of the Bengali is almost a bye-word for meagreness. Taking 500 prisoners admitted into the Krishnagar District Jail I found their weight on admission to be as follows :—

Weight on Admission According to Age.

	Hindus.						Mahomedans.						
	80 lbs. or 36·320 kgms. and less.	81 to 90 lbs. or 36·77–40·86 kgms.	91 to 100 lbs. or 41·31–45·4 kgms.	101 to 110 lbs. or 45·85–49·9 kgms.	Above 110 or 49·940 kgms.	Total	80 lbs. or 36·320 kgms. and less.	81 to 90 lbs. or 36,77–40·86 kgms.	91 to 100 lbs. or 41·8 to 45·4 kgms.	101-110 lbs. or 45·85–49·9 kgms.	Above 110 lbs. or 49·940 kgms.	Total	Grand Total.
Not exceeding 20 yrs.	2	1	3	13	4	23	4	2	7	5	0	18	41
21 to 30	2	6	24	52	28	112	6	9	23	54	19	111	223
31 to 40	0	0	5	5	20	30	0	3	5	40	14	62	92
41 to 50	0	0	5	14	8	27	5	4	3	7	11	30	57
Above 50	0	0	23	2	2	27	4	9	18	17	12	66	87
Total	4	7	60	86	62	219	19	27	56	123	56	281	500

49·940 kilogrammes, 110lbs. is supposed to be the normal weight of a healthy Bengali or Behar prisoner.

Out of a thousand prisoners admitted consecutively, there was not one who weighed 68·100 kilogrammes, or 150lbs. or 10 stone 10lbs. The men were by no means all starving thieves. They included a large proportion of men committed for offences against persons, such as assault, riot, robbery, and murder and were physically fairly representative of the general mass of the people. That Malaria has been a most important factor in reducing the men into such a miserable condition there is no doubt. There can be equally no doubt that insufficient food and unhealthy homes have been equally potent factors.

Medico—topographical History of Nadia District 1900. By the author, (unpublished).

APPENDIX II.

EFFECT OF ADDITION OF SMALL QUANTITY OF FORMALIN ON THE DECOMPOSITION OF URINE.

Urine passed at 8 A.M. 12-4-04.

Date	Amount of Nitrogen obtained from 5 cc of urine.	Specific Gravity	Reaction
	G.		
12-4-04	16	1008	Acid
13-4-04	16	1008	Acid
14-4-04	16	1008	Alkaline
15-4-04	16	1008	„
16-4-04	16	1008	„
17-4-04	14	1008	„
18-4-04	14	1008	„
19-4-04	8	1008	„
	N.		
12-4-04	42	1024	Acid
13-4-04	42	1024	Acid
14-4-04	42	1024	Alkaline
15-4-04	42	1024	„
16-4-04	42	1024	„
17-4-04	42	1024	„
18-4-04	42	1024	„
19-4-04	36	1020	„

The same specimen of Urine to a portion of which Formalin had been added.

	Amount of Nitrogen obtained from 5cc of Urine.	Specific Gravity.	Reaction.
	G.		
19-4-04	16	1008	Acid
	N.		
19-4-04	42	1024	Acid

APPENDIX III.

HEIGHT, WEIGHT, AND OCCUPATION OF THE MEN UNDER OBSERVATION.

NAME.		WAGES. Killogram.	lbs.	HEIGHT. ft. and in.	m.		OCCUPATION.
Guru Charan Muchi	...	49·8960	110	5-3"	1·60	...	Convict warder.
Gopal Mandal	...	52·1640	115	5-5'.	1·65	...	Gardener.
Mohim Mandal	...	45·4136	101	5-4⅕"	1·63	...	Carpenter.
Nanda Shaik	...	53·0712	118	5-7"	1·70	...	Convict Overseer.
Ram Chandra Dutt	...	49·4424	109	5-5"	1·65	...	Gardener.
Rasik Lal Dey	...	52·1640	115	5-5½"	1·66	...	Cook.
Sonaton Mandal	...	46·2672	101	5-3¼"	1·61	...	Sweeper.
Gonee Shaik	...	62·1432	137	5-7"	1·70	...	Water carrier.
Bahadur Munshi	...	43·5456	92	5-1¾"	1·57	...	Gardener.
Begum Chang	...	46·7208	103	5-1½"	1·56	...	Convict Warder.
Madan Fakir	...	48·5352	107	5-5¼"	1·66	...	Gardener.
Kanai Shaik	...	59·8752	132	5-5½"	1·66	...	Gardener.
Mahommed Hosein	...	47·6280	105	5-0"	1·52	...	Convict Overseer.
Rahamatulla Sheik	...	50·8032	112	5-3¾"	1·62	...	Water carrier.
Osman Behara	...	46·2672	102	5-5¼"	1·66	...	Gardener.

Month of March 1904.

Articles of food and their Weight.

March.	Oryza Sativa.	Leguminous seeds (Dhal).	Green Vegetable.	Salt.	Oil.	Spices.	Tamarindus Indicus.
	26 ozs. 808·86 Grammes.	6 ozs. 186·66 Grammes.	6 ozs. 186·66 Grammes.	5 drms. 19·49 Grammes.	4drms. 15·56 Grammes.	2drms. 7·78 Grammes.	3drms. 11·69 Grammes.
11	do.	Cicer Arietenum. (Chola)	do.	do.	do.	do.	do.
12	do.	do.	do.	do.	do.	do.	do.
13	do.	Pisum Arvense (Matar)	do.	do.	do.	do.	do.
14	do.	Cicer Arietenum.	do.	do.	do.	do.	do.
15	do.	Pisum Arvense.	do.	do.	do.	do.	do.
16	do.	Cicer Arietenum.	do.	do.	do.	do.	do.
17	do.	do.	do.	do.	do.	do.	do.
18	do.	do.	do.	do.	do.	do.	do.
19	do.	do.	do.	do.	do.	do.	do.

March.							
20	do.	Pisum Arvense.	do.	do.	do.	do.	do.
21	do.	do.	do.	do.	do.	do.	do.
22	do.	Cicer Arietenum.	do.	do.	do.	do.	do.
23	do.	Pisum Arvense.	do.	do.	do.	do.	do.
24	do.	Cicer Arietenum.	do.	do.	do.	do.	do.
25	do.	Pisum Arvense.	do.	do.	do.	do.	do.
26	do.	Cicer Arietenum.	do.	do.	do.	do.	do.
27	do.	Pisum Arvense.	do.	do.	do.	do.	do.
28	do.	Cicer Arietenum.	do.	do.	do.	do.	do.
29	do.	do.	do.	do.	do.	do.	do.
30	do.	do.	do.	do.	do.	do.	do.
31	do.	do.	do.	do.	do.	do.	do.

MONTH OF APRIL 1904.

Articles of food and their Weight.

April.	ORYZA SATIVA.	LEGUMINOUS seeds (Dhal).	GREEN VEGETABLE.	SALT.	OIL.	SPICES.	TAMARINDUS INDICUS.
	26 ozs. 808·86 Grammes.	6 ozs. 186·66 Grammes.	6 ozs 186.66 Grammes.	5 drs. 19·49 Grammes.	4 drms. 15.56 Grammes.	2 drms. 7.78 Grammes.	3 drms. 11.69 Grammes.
1	do.	Pisum Arvense.	do.	do.	do.	do.	do.
2	do.	do.	do.	do.	do.	do.	do.
3	do.	do.	do.	do.	do.	do.	do.
4	do.	do.	do.	do.	do.	do.	do.
5	do.	do.	do.	do.	do.	do.	do.
6	do.	do.	do.	do.	do.	do.	do.
7	do.	do.	do.	do.	do.	do.	do.
8	do.	do.	do.	do.	do.	do.	do.
9	do.	do.	do.	do.	do.	do.	do.

10	do.	do.	do.	do.	do.	do.	do.
11	do.	do.	do.	do.	do.	do.	do.
12	do.	do.	do.	do.	do.	do.	do.
13	do.	do.	do.	do.	do.	do.	do.
14	do.	do.	do.	do.	do.	do.	do.
15	do.	do.	do.	do.	do.	do.	do.
16	do.	do.	do.	do.	do.	do.	do.
17	do.	do.	do.	do.	do.	do.	do.
18	do.	do.	do.	do.	do.	do.	do.
19	do.	do.	do.	do.	do.	do.	do.
20	do.	do.	do.	do.	do.	do.	do.
21	do.	do.	do.	do.	do.	do.	do.
22	do.	do.	do.	do.	do.	do.	do.
23	do.	do.	do.	do.	do.	do.	do,

April.	Oryza Sativa.	Leguminous. seeds.	Green Vegetable.	Salt.	Spices.	Tamarindus Indicus.	
	26 ozs. 808·86 Grammes.	6 ozs. 186 66 Grammes.	6 ozs. 186·66 Grammes.	5 drachms 15·56 Grammes.	5 drachms 7.78 Grammes.	3 drms. 11·69 Grammes.	
24	do.	do.	do.	do.	do.	do.	do.
25	do.	do.	do.	do.	do.	do.	do.
26	do.	do.	do.	do.	do.	do.	do.
27	do.	do.	do.	do.	do.	do.	do.
28	do.	do.	do.	do.	do.	do,	do.
29	do.	do.	do.	do.	do.	do.	do.
30	do.	do.	do.	do.	do.	do.	do.

MONTH OF MAY 1904.

1	do.	Pisum Arvense	do.	do.	do.	do.	do.
2	do.	Ervumlens (Musuri)	do.	do.	do.	do.	do.
3	do.	Pisum Arvense	do.	do.	do.	do.	do.
4	do.	Ervumlens	do.	do.	do.	do.	do.
5	do.	do.	do.	do.	do.	do.	do.
6	do.	do.	do.	do.	do.	do.	do.
7	do.	do.	do.	do.	do.	do.	do.
8	do.	Pisum Arvense	do.	do.	do.	do.	do.
9	do.	Ervumlens	do.	do.	do.	do.	do.
10	do.	Pisum Arvense	do.	do.	do.	do.	do.
11	do.	Ervumlens	do.	do.	do.	do.	do.
12	do.	Pisum Arvense	do.	do.	do.	do.	do.
13	do.	Ervumlenes	do.	do.	do.	do.	do.

Articles of food and their weight.

May.	Oryza Sativa. 26 ozs. 808·86 Grammes.	Leguminous. Seeds (Dhal). 6 ozs. 186·66 Grammes.	Green Vegetable. 6 ozs. 186·66 Grammes.	Salt. 5 drms. 15·56 Grammes.	Spices. 2 drms. 7·78 Grammes.	Tamarindus Indicus. 3 drms. 11·69 Grammes.	
14	do.	Pisum Arvense (Matar)	do.	do.	do.	do.	do.
15	do.	Ervumlens (Musuri)	do.	do.	do.	do.	do.
16	do.	Pisum Arvense	do.	do.	do.	do.	do.
17	do.	do.	do.	do.	do.	do.	do.
18	do.	do.	do.	do.	do.	do.	do.
19	do.	do.	do.	do.	do.	do.	do.
20	do.	do.	do.	do.	do.	do.	do.
21	do.	do.	do.	do.	do.	do.	do.
22	do.	do.	do.	do.	do.	do.	do.
23	do.	do.	do.	do.	do,	do.	do,

May							
24	do.	do.	do.	do.	do.	do.	do.
25	do.	do.	do.	do.	do.	do.	do.
26	do.	do.	do.	do.	do.	do.	do.
27	do.	Ervumlens	do.	do.	do.	do.	do.
28	do.	Pisum Arvense	do.	do.	do.	do.	do.
28	do.	Ervumlens	do.	do.	do.	do.	do.
29	do.	Pisum Arvense	do.	do.	do.	do.	do.
30	do.	Ervumlens	do.	do.	do.	do.	do.
31	do.	Pisum Arvense	do.	do.	do.	do.	do.

Month of June 1904.

Articles of food and their weight.

June.	Oryza Sativa.	Leguminous Seed (Dhal).	Green Vegetable.	Salt.	Oil.	Spices.	Tamarindus Indicus.
	26 ozs. 186·16. Grammes.	6 ozs. 308·86 Grammes.	6 ozs. 186·66 Grammes.	5 drms. 19·42 Grammes.	4 drms. 19 56 Grammes.	2 drms. 7·78 Grammes.	3 drms. 11·69 Grammes.
1	do.	Ervumlens (Musuri)	do.	do.	do.	do.	do.
2	do.	Pisum Arvense (Matar)	do.	do.	do.	do.	do.
3	do.	Ervumlens	do.	do.	do.	do.	do.
4	do.	Pisum Arvense	do.	do.	do.	do.	do.
5	do.	Ervumlens	do.	do.	do.	do.	do.
6	do.	Pisum Arvense	do.	do.	do.	do.	do.
7	do.	Ervumlens	do.	do.	do.	do.	do.
8	do.	Pisum Arvense	do.	do.	do.	do.	do.
9	do.	Ervumlens	do.	do.	do.	do.	do.

10	do.	Pisum Arvense (Matar)	do.	do.	do.	do.	do.
11	do.	Ervumlens (Musuri)	do.	do.	do.	do.	do.
12	do.	Cicer Arietenum (Chhola)	do.	do.	do.	do.	do.
13	do.	Pisum Arvense	do.	do.	do.	do.	do.
14	do.	Ervumlense	do.	do.	do.	do.	do.
15	do.	Pisum Arvense	do.	do.	do.	do.	do.
16	do.	Ervumlens	do.	do.	do.	do.	do.
17	do.	Pisum Arvense	do.	do.	do.	do.	do.
18	do.	Cicer Arietenum	do.	do.	do.	do.	do.
19	do.	Pisum Arvense	do.	do.	do.	do.	do.
20	do.	Ervumlens	do.	do.	do.	do.	do.
21	do.	Pisum Arvense	do.	do.	do.	do.	do.
22	do.	Cicer Arietenum	do.	do.	do.	do.	do.
23	do.	Ervumlens	do.	do.	do.	do.	do.

Articles of food and their weight.

June.	Oryza Sativa.	Leguminous. Seeds (Dhal)	Green Vegetable.	Salt.	Oil.	Spices.	Tamarindus Indicus.
	25 ozs. 808·86. Grammes.	6 ozs. 186·66 Grammes.	6 ozs. 186·66 Grammes.	5 drms, 19·49 Grammes.	4 drms. 15·56 Grammes.	2 drms. 11·69 Grammes.	3 drms. 11·69 Grammes.
24	do.	Pisum Arvense	do.	do.	do.	do.	do.
25	do.	Cicer Arietenum	do.	do.	do.	do.	do.
26	do.	Ervumlens	do.	do.	do.	do.	do.
27	do.	Pisumlens	do.	do.	do.	do.	do.
28	do.	Cicer Arietenum	do.	do.	do.	do.	do.
29	do.	Ervumlense	do.	do.	do.	do.	do.
30	do.	Pisum Arvense	do.	do.	do.	do.	do.
			Month of July.				
1	do.	Cicer Arietenum	do.	do.	do.	do.	do.
2	do.	Ervumlens	do.	do.	do.	do.	do.
	do.	Pisum Arvense	do.	do.	do.	do.	do.

APPENDIX III.

11TH MARCH 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1700	21.37	1.26	1020	79.30	
Rahamatulla ...	1050	14.40	1.37	1020	49.00	
Mohim Mandal ...	1700	17.49	1.03	1010	39.60	
Mohammad Hosein ...	2250	12.86	.57	1010	52.59	
Osman Behara ...	1650	15.09	.91	1010	38.50	
Nanda Shaik ...	3300	26.40	.80	1010	77.00	
Gopal Mandal ...	1450	14.91	1.03	1010	33 80	

Temperature

Rainfall 0.00

12TH MARCH 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	1400	20.80	1.48	1010	32.60	
Rahamatulla	...	1002	13.71	1.37	1010	23.34	
Mohim Mandal	...	950	14.11	1.48	1012	26.60	
Mahammad Hosein	...	1900	17.37	.91	1010	44.30	
Osman Behara	...	900	13.37	1.48	1020	42.00	
Nanda Shaik	...	2250	15.42	.68	1008	42.00	
Gopal Mandal	...						

Temperature

Rainfall 0.00

13TH MARCH 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids gramme.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	1454	19.94	1.37	1010	33.92	
Rahamatulla	...	1500	25.71	1.71	1012	42.00	
Mohim Mandal	...	1948	23.40	1.20	1014	64.44	99lbs.
Mahammad Hosein	...	1600	16.43	1.03	1010	37.30	
Osman Behara	...	900	12.31	1.37	1012	25 20	102lbs.
Nanda Shaik	...	1308	10.49	.80	1010	30.46	
Gopal Mandal	...	1550	23.03	1.48	1014	50.60	114lbs.

			M.	E.
Temperature	..	...		78°
Rainfall	...	...		0.00

14TH MARCH 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage in urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1675	21.06	1.26	1010	39.00	
Nanda Shaik ...	1704	21.43	1.26	1012	47.69	
Rahamatulla ...	1350	15.43	1.14	1010	31.50	
Mohim Mandal ...	1700	19.43	1.14	1012	47.60	
Mahammad Hosein ...	1885	10.86	.68	1010	43.90	
Osman Behara ...	1858	19.13	1.03	1012	51.99	
Gopal Mandal ...	1256	18.63	1.49	1014	40.96	

	M.	E.
Temperature	77°	87°
Rainfall	0.00	

15TH MARCH 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1300	22.29	1.71	1012	36.40	
Rahamatulla ...	1000	19.43	1.94	1012	28.00	
Mohim Mandal ...	1100	13.83	1.26	1010	25.60	
Mahammad Hosein ...	1274	13.11	1.03	1010	29.68	
Osman Behara ...	950	19.54	2.06	1014	31.00	
Nanda Shaik ...	2150	34.40	1.60	1C12	60.20	
Gopal Mandal ...	1200	24.69	2.05	1014	39.20	

	M.	E.
Temperature	80°	87°
Rainfall	0.00	

16TH MARCH 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1000	24.00	2.40	1020	46.60	
Rahamatulla ...	950	13.17	1.37	1010	22.10	
Mohim Mandal ...	650	13.74	2.11	1014	21.23	
Mahammad Hosein ...	1900	21.74	1.14	1010	44.30	
Osman Behara ...	1274	16.09	1.49	1010	29.68	
Nanda Shaik ...	1600	14.63	.91	1010	37.30	
Gopal Mandal ...	1600	29.26	1.83	1010	37.30	
Ram Ch. Datta ...	1700	25.26	1.49	1010	39.60	

		M.	E.
Temperature	... ...	79°	83°
Rainfall	... ...	0.00	

17TH MARCH 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1150	14.46	1.26	1010	26.80	
Rahamatulla ...	1350	23.14	1.71	1012	31.80	
Mohim Mandal ...	1250	18.56	1.49	1010	29.10	
Mahammad Hosein ...	1900	15.20	.80	1004	17.70	
Osman Behara ...	750	13.71	1.83	1010	17.50	
Nanda Shaik ...	1800	16.45	.91	1006	25.20	
Gopal Mandal ...	1300	19.31	1.49	1010	30.30	
Ram Ch. Datta ...	2000	22.85	1.14	1008	37.30	

			M.	E.
Temperature	...	...	81°	84°
Rainfall	...	...	0.00	

18TH MARCH 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	700	19.20	2.74	1020	32.60	
Rahamatulla ...						
Mohim Mandal ...	1700	25.29	1.49	1010	39.60	
Mahammad Hosein ...	1400	17.60	1.26	1006	19.60	
Osman Behara ...	900	18.51	2.05	1014	29.40	
Nanda Shaik ...	2000	16.00	.80	1008	37.30	
Gopal Mandal ...	1160	16.34	1.49	1014	35.90	
Ram Ch. Datta ...	1200	16.46	1.37	1010	28.00	

	M.	E.
Temperature	82°	85°
Rainfall	0.00	

19TH MARCH 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1150	14.46	1.26	1008	21.46	
Rahamatull ...	650	17.09	2.63	1010	15.10	
Mohim Mandal ...	1300	13.37	1.03	1004	18.60	
Mahammad Hosein ...	2000	20.57	1.03	1004	18.60	
Osman Behara ...	650	13.37	2:05	1010	15.10	
Nanda Shaik ...	1400	17.60	1.26	1004	13.00	
Gopal Mandal ...	900	24 69	2.74	1016	33.60	
Ram Ch. Datta ...	1200	17.83	1.49	1006	16.80	

			M.	E.
Temperature	...	...	82°	85°
Rainfall	...	...	0.00	

20TH MARCH 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	950	22 80	2.40	1012	26.60	
Rahamatulla ...	800	20.11	2.51	1012	22.40	
Mohim Mandal ...	1650	20 74	1.26	1006	23.10	
Mahammad Hosein ...	1300	17.83	1.37	1006	18.20	
Osman Behara ...						
Nanda Shaik ...	1350	14.66	1.09	1004	12.60	
Gopal Mandal ...	1150	23.14	2.28	1016	42.90	
Ram Ch. Datta ...	1500	24.00	1.60	1006	21.00	

			M.	E.
Temperature	...	...	82°	84°
Rainfall	...	...	0.00	

21ST MARCH 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	1600	27.43	1.71	1010	37.30	
Rahamatulla	...	600	19.20	3.20	1020	28.00	
Mohim Mandal	...	1100	12.59	1.14	1012	30.80	
Mahammad Hosein	...	850	13.60	1.60	1012	23.80	
Osman Behara	...	1150	14.46	1.26	1012	32.22	
Nanda Shaik	...	1150	14.46	1.26	1010	26.80	
Gopal Mandal	...	950	23.89	2.57	1018	39.90	
Ram Ch. Datta	...	900	11.31	1.26	1008	16.80	

			M.	E.
Temperature	...	...	82°	85°
Rainfall	...	...	0.00	

22ND MARCH 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	550	16.97	3.02	1020	25.60	
Rahamatulla ...	650	22.29	3.43	1022	33.30	
Mohim Mandal ...	1250	18.57	1.49	1012	35.00	
Mahammad Hosein ...	1750	20.00	1.14	1008	32.60	
Osman Behara ...	850	13.60	1.60	1010	19.80	
Nanda Shaik ...	1850	19.02	1.03	1008	34.50	
Gopal Mandal ...	650	14.12	2.17	1020	30.30	
Ram Ch. Datta ...	1250	18.57	1.49	1008	23.30	

			M.	E.
Temperature	...	...	81°	84°
Rainfall	...	...	0.00	

23RD MARCH 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	900	23.66	2.63	1020	42.00	
Rahamatulla	...	850	21.37	2.51	1018	35.70	
Mohim Mandal	...	1000	11.43	1.14	1010	23.30	
Mahammad Hosein	...						
Osman Behara	...	850	23.31	2.74	1020	39.60	
Nanda Shaik	...	1650	15.09	.91	1008	30.80	
Gopal Mandal	...	1100	16.34	1.49	1012	30.80	
Ram Ch, Datta	...	1650	20.74	1.26	1010	38.50	

			M.	E.
Temperature	...	...	83°	84°
Rainfall	...	...	0,00	

24TH MARCH 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1450	33.14	2.28	1012	40.60	
Rahamatulla ...	550	11.94	2.17	1020	25.60	
Mohim Mandal ...	850	14.57	1.71	1018	35.70	
Mahammad Hosein ...	1200	10.97	.91	1010	28.00	
Osman Behara ...	1000	16.00	1.60	1020	46.60	
Nanda Shaik ...	1650	13.70	.80	1010	38.50	
Gopal Mandal ...	1150	17.09	1.49	1014	37.50	
Ram Ch. Datta ...	1600	18.29	1.14	1010	37.30	

			M.	E.
Temperature	...	...	83°	84°
Rainfall	...	...	0.00	

25TH MARCH 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1000	25.14	2.51	1020	46.60	
Rahamatulla ...	850	17.49	2.05	1020	39.60	
Mohim Mandal ...	1100	16.34	1.49	1012	30.80	
Mahammad Hosein ...	1700	13.60	.80	1010	39.60	
Osman Behara ...	1550	15.94	1.03	1010	36.10	
Nanda Shaik ...	1250	14.29	1.14	1010	29.10	
Gopal Mandal ...	1150	16.51	1.49	1012	32.20	
Ram Ch. Datta ...	1500	17.14	1.14	1010	35.00	

			M.	E.
Temperature	...	...	83°	84°
Rainfall	...	...	0.00	

26TH MARCH 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1350	35.49	2.63	1020	63.00	
Rahamatulla ...	400	8.22	2.05	1020	18.60	
Mohim Mandal ...	750	12.86	1.71	1014	24.50	100lbs.
Mahammad Hosein ...	1450	11.60	.80	1010	33.80	
Osman Behara ...	1100	17.60	1.60	1014	35.90	101lbs.
Nanda Shaik ...	1350	15.43	1.14	1010	31.50	
Gopal Mandal ...	700	12.00	1.71	1014	22.80	114lbs.
Ram Ch. Datta ...	1400	17.60	1.26	1010	32.60	112lbs.

		M.	E.
Temperature	... ...	83°	84°
Rainfall	... ...	0.00	

27TH MARCH 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		cc.	Grms.			Grms.	
Guru Charan	...	1200	24·69	2·05	1016	44·80	
Rahamatulla	...	1100	26·40	2·40	1018	46·20	
Mohim Mandal	...	800	14·63	1·83	1018	33·60	100 lbs.
Mahammad Hosein	...	1150	13·14	1.14	1010	26·80	
Osman Behara	...	1000	19·43	1·94	1016	37·30	101 lbs.
Nando	...	1850	16·91	·91	1010	43·10	
Gopal Mandal	...	1250	18·57	1·49	1018	52·50	114 lbs.
Ram Ch. Datta	...	700	8·80	1·26	1010	16·30	112 lbs.

			M.	E.
Temperature	...	...	83°	87°
Rainfall	...	...	00·0	

28TH MATH 1904

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1000	24·00	2·40	1014	32·60	
Rahamatulla ...	700	20·00	2·85	1022	35·90	
Mohim Mandal ...	700	14·40	2·05	1020	32·60	
Mahammad Hosein ...	1460	14·91	1·03	1010	33·80	
Osman Behara ...	650	10·40	1·60	1012	18·20	
Nanda Shaik ...	1000	20·56	2·05	1012	28·00	
Gopal Mandal ...	1158	18·40	2·17	1016	42·90	
Ram Ch. Datta ...	1500	9·60	·91	1010	35·00	

		M.	E.
Temperature	... ...	82°	86°
Rainfall	... ...	0·00	

29TH MARCH 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	650	15·60	2·40	1020	30·30	
Rahamatulla	...	550	20·75	3·77	1024	30·80	
Mohim Mandal	...	700	12·80	1·83	1014	22·80	
Mahammad Hosein	...	1000	14·86	1·49	1012	28·10	
Osman Behara	...	600	20·57	3·43	1022	30·80	
Nanda Shaik	...	1700	19·43	1·14	1010	39·60	
Gopal Mandal	...	900	15·43	1·71	1016	33·60	
Ram Ch. Datta	...	1450	24·86	1·71	1012	40·60	
Messer Shaik	...	150	4·12	2·74	1040	14·00	

			M.	E.
Temperature	...	...	82°	88°
Rainfall	...	...	0·00	

30TH MARCH 1904

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	600	17·83	2·97	1020	28 00	
Rahamatulla ...	650	16·34	2·51	1020	30·30	
Mohim Mandal ...	800	15·54	1·94	1014	26·10	
Mahammad Hosein ...	500	10·86	2·17	1020	43·30	
Osman Behara ...	950	18·52	2·05	1020	44·30	
Nanda Shaik ...	950	10·86	1·14	1010	22.10	
Gopal Mandal ...	1150	19·71	1·71	1012	32·20	
Ram Ch. Datta ...	1650	22·63	1·37	1016	61·60	
Messer Shaik ...	350	5.20	1·49	1626	21·20	

		M.	E.
Temperature ...	...	81°	89°
Rainfall ...	...	0·00	

31ST MARCH 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	800	17·37	2·17	1020	37·30	
Messer Shaik ...	600	20·57	3·43	1020	28·00	
Mohim Mandal ...						
Mahammad Hosin ...	900	12·34	1·37	1014	29·40	
Osman Behara ...	1000	20·57	2·05	1014	32·60	
Nanda Shaik ...	1000	13·71	1·37	1008	18·60	
Gopal Mandal ...	1150	21·03	1·83	1014	37 50	
Ram Ch. Datta ...	1600	20·11	1·26	1010	37·30	

	M.	E.
Temperature	85°	90°
Rainfall	0·00	

1st April 1904.

Name.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	600	18.52	3.02	1020	28.00	
Messer Shaik ...	1200	15.09	1.26	1012	33.60	
Mohim Mandal ...	650	12.63	1.94	1014	21.23	
Mahammad Hosein ...	1150	17.20	1.37	1010	26.80	
Osman Behara ...	850	17.94	1.94	1020	39.60	
Nanda Shaik						
Gopal Mandal ...	900	13.37	1.49	1010	21.00	
Ram Ch. Datta ...	2150	17.20	.80	1010	50.10	

		M.	E.
Temperature	... ...	85°	90°
Rainfall	... ...	0.00	

2nd April 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1000	19.43	1.94	1016	37.30	
Messer Shaik ...	1850	21.14	1.14	1010	43.10	
Mohim Mandal ...	1100	18.86	1.71	1010	25.60	
Mahammad Hosein ...	1000	11.43	1.14	1010	23.30	
Osman Behara ...	850	22.34	2.63	1016	31.70	
Nanda Shaik ...	1600	12.80	.80	1010	37.30	
Gopal Mondal ...	1150	18.40	1.60	1014	37.60	
Ram Ch. Datta ...	1100	17.60	1.60	1010	25.60	

		M.	E.
Temperature	... ...	85°	88°
Rainfall	... ...	0.00	

3RD APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	950	14 57	1.71	1010	22.10	
Messer Shaik ...	1500	17.14	1.14	1010	35.00	
Mohim Mandal ...	1600	18.29	1.14	1010	37.30	
Osman Behara ...	1400	28.80	2.05	1010	32.60	
Nanda Shaik ...	1550	24.80	1.60	1010	36.10	
Gopal Mandal ...	1000	18.29	1.83	1014	32.60	
Ram Ch. Datta ...	1400	19.20	1.37	1008	26.10	

	M.	E.
Temperature	85°	87°
Rainfall	0.00	

4TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	850	15 54	1.83	1020	39.60	
Messer Shaik ...	2500	14.29	.51	1010	58 30	
Mohim Mandal ...	900	13.37	1.49	1010	21.00	100lbs.
Osman Behara ...	1500	17.14	1.14	1010	35.00	101lbs.
Nanda Shaik ...	2150	14 74	.69	1010	50.10	
Gopal Mandal ...	1150	21.03	1.83	1014	37.50	115lbs.
Ram Ch. Datta ...	2000	25.14	1.26	1010	46.60	116lbs.
Madan Fakir ...	300	8.57	2.85	1020	14.00	

	M.	E.
Temperature	85°	87°
Rainfall	0.00	

5TH APRIL 1905.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	550	16.97	3.02	1022	28.23	
Messer Shaik ...	1800	10.29	·57	1008	33.60	
Mohim Mandal ...	1000	14.86	1.49	1010	23.30	
Nanda Shaik ...	1700	13.60	.80	1010	39.60	
Osman Behara ...	850	16.51	1.94	1020	39.60	
Gopal Mandal ...	1350	17.09	1.37	1012	37.80	
Ram Ch. Datta ...	1550	23.03	1.49	1010	36.10	
Madan Fakir ...	1100	16.34	1.49	1014	35.90	

	M.	E.
Temperature	85°	87°
Rainfall	00.0	

6th April 1904.

Name.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	700	17.60	2.51	1022	35.90	
Messer Shaik ...	1550	17.71	1.14	1010	36.10	
Mohim Mandal ...	1100	11.31	1.03	1010	25.60	
Nanda Shaik ...	1350	17.09	1.37	1010	31.50	
Osman Behara ...	1900	30.40	1.60	1012	53.20	
Gopal Mandal ...	600	8.22	1.37	1010	14.00	
Ram Ch. Datta ...	2000	22.86	1.14	1008	37.30	
Madon Fakir ...	1900	23.89	1.26	1010	44 30	

			M.	E.
Temperature	...	...	85°	87°
Rainfall	...	...		0.04

7TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	650	16.34	2.51	1020	30.30	
Messer Shaik ...	1600	20·11	1.26	1010	37.30	
Mohim Mandal ...	1000	16.00	1.60	1012	28.00	
Nanda Shaik ...	2150	29.49	1.37	1010	50.10	
Osman Behara ...	1250	25.71	2.05	1010	29.10	
Gopal Mandal ...	2350	40.29	1.71	1014	76.70	
Ram Ch. Datta ...	1450	11.60	.80	1010	33.80	
Madon Fakir ...	600	17.14	1.71	1010	14.00	

		M.	E.
Temperature ...	...	85°	89°
Rainfall ...	...	1.01	

8TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1150	24.97	2.17	1010	20.80	
Messer Shaik ...	2100	19.20	·91	1010	49.00	
Mohim Mandal ...	1000	11.43	1.14	1010	23.30	
Nanda Shaik ...	2000	9.60	.69	1008	37.30	
Osman Behara ...	850	14.50	1.71	1020	39.60	
Ram Ch. Datta ...	1400	17.60	1.26	1010	40.60	
Madan Fakir ...	850	12.63	1.49	1014	32.60	
Gopal Mandal ...	1450	21.54	1.49	1012	27.70	

		M	E.
Temperature ...	...	85°	89°
Rainfall ...	...	0.00	

9TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	800	18.29	2.28	1024	44.80	
Mohim Mandal ...	1500	18.86	1.26	1010	35.00	
Nanda Shaik ...	1200	10.97	.91	1010	28.00	
Osman Behara ...	1300	17.83	1.37	1018	54.60	
Gopal Mandal ...	1250	20.00	1.60	1018	52.50	
Ram Ch. Datta ...	1700	17.49	1.03	1012	47.60	
Madan Fakir ...	1900	17.14	1.71	1010	23.30	
Sonaton Mandal ...	950	16.29	1.71	1012	26.60	

	M.	E.
Temperature	85°	89°
Rainfall	0.16	

10TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1300	25.26	1.94	1014	42.48	
Mohim Mandal ...	1650	18.86	1.14	1010	38.50	99 lbs.
Nanda Shaik ...	2000	11.43	.57	1008	37.30	
Osman Behara ...	1300	17.83	1.37	1012	36.40	101 lbs.
Gopal Mandal ...	1000	16.00	1.60	1014	32.60	115 lbs.
Ram Ch. Datta ...	1350	18.51	1.37	1010	31.50	115 lbs.
Madan Fakir ...	1450	31.49	2.17	1010	33.80	
Sonatan Mandal ...	1100	15.09	1.37	1014	35.90	

		M.	E.
Temperature ...	...	80°	89°
Rainfall ...	...	0.25	

11TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1250	18.57	1.49	1014	40.80	
Mohim Mandal ...	1250	14.29	1.14	1010	29.10	
Nanda Shaik ...	1850	8.46	.45	1010	43.10	
Osman Behara ...	1900	17.37	.91	1012	53.20	
Gopal Mandal ...	1550	14.17	.91	1014	50.60	
Ram Ch. Datta ...	1450	16,57	1.14	1012	40.60	
Madan Fakir ...						
Sonatan Mandal ...	1850	10.57	.57	1010	43.10	

			M.	E.
Temperature	...	...	77°	89°
Rainfall	...	...	1.78	

12TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	850	13.60	1.60	1012	23.80	
Mohim Mandal ...	1050	12.00	1.14	1010	24.30	
Nanda Shaik ...	1900	17.37	.91	1010	44 30	
Osman Behara ...	1150	24.97	2.17	1018	48.30	
Gopal Mandal ...	600	12.34	2.05	1010	14.00	
Ram Ch. Datta ...	1100	16.36	1.49	1010	25.60	
Madan Fakir ...	1450	21.54	1.49	1014	47.30	
Sonaton Mandal ...	1250	18.57	1.49	1012	35.00	
Bahadur Munshi ...	2250	30·86	1.37	1012	63 00	
Gonee Shaik ...	1050	21 60	2.05	1020	49·00	
Begum Chang ...	800	12 80	1·60	1012	22·40	

			M.	E.
Temperature	...	...	82°	89°
Rainfall	...	...	0.48	

13TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	950	17.37	1.83	1014	31.00	
Mohim Mandal ...	1300	31.20	2.4	1012	36.40	
Nanda Shaik ...	1900	8.69	·450	1010	44.30	
Osman Behara ...	1200	15.86	1.26	1010	28.00	
Gopal Mandal ...	1300	17.83	1.37	1010	30.30	
Ram Ch. Datta ...	1600	16.43	1.03	1010	37.30	
Madan Fakir ...	1750	22.00	1.26	1010	40.80	
Sonaton Mandal ...	1100	12.56	1.14	1012	30.80	
Bahadur Munshi ...	500	28.57	·57	1016	18.60	
Gonee Shaik ...	1000	17.14	1·71	1018	42·00	
Begum Chang ...	1150	14.46	1.26	1012	32.20	

		M.	E.
Temperature	... ...	87°	89°
Rainfall	... ...	0.00	

14TH APRIL 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	1500	18.46	1.26	1020	70.00	
Mohim Mandal	...	500	10.86	2.71	1020	23.30	
Nanda Shaik	...						
Osman Behara	...	900	12.34	1.37	1020	42.00	
Gopal Mandal	...	1250	20.00	1.60	1014	40.80	
Ram Ch. Datta	...	1600	10.97	.69	1010	37.30	
Madan Fakir	...	1250	27.14	2.17	1020	58.30	
Sonaton Mandal	...	1200	21.94	1.83	1014	39.20	
Bahadur Munshi	...	950	26.00	2.74	1020	44.30	
Gonee Shaik	...	900	15.43	1.71	1020	42.00	
Begum Chang	...	1000	14.84	1.49	1020	46.60	

			M.	E.
Temperature	...	...	85°	87°
Rainfall	...	...	0.00	

15TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1000	14.86	1.49	1014	32.60	
Mohim Mandal ...	650	11.89	2.83	1020	30.30	
Nanda Shaik ...	2400	16.46	.69	1010	56.00	
Osman Behara ...	1000	14.86	1.49	1020	46.60	
Gopal Mandal ...	1250	14.29	1.14	1014	40.80	
Ram Ch. Datta ...	1900	17.37	.91	1010	44.30	
Madan Fakir ...	950	13 03	1.37	1012	26.60	
Sonaton Mandal ...	1450	16.57	1.14	1014	47.30	
Bahadur Munshi ...	1350	18.63	1.49	1018	56.70	
Gonee Shaik ...	1000	14.86	1.49	1020	46.46	
Begum Chang ...	1200	12.34	1.03	1012	33.60	

		M.	E.
Temperature ...	...	85°	87°
Rainfall ...	...	0.00	

16TH APRIL 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...						
Mohim Mandal	...	1250	15.00	1.2	1014	40.80	
Nanda Shaik	...	1700	8.47	.51	1008	31.70	
Osman Behara	...	1450	33.97	2.34	1016	54 10	
Gopal Mandal	...	1900	24.94	1.31	1014	62.00	
Ram Ch. Datta	...						
Madan Fakir	...	950	14.63	1.54	1012	26.60	
Sonaton Mandal	...	1950	20.06	1.03	1010	45.50	
Bahadur Munshi	...	1350	24.69	1.83	1012	37.80	
Gonee Shaik	...	1600	21.94	1.37	1016	59.70	
Begum Chang	...	1100	11.94	1.09	1016	41.00	

			M. F.
Temperature	...	...	86° 87°
Rainfall	...	...	0.00

17TH APRIL 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	800	20.11	2.51	1020	37.30	
Nanda Shaik	...	1275	19.67	1.54	1018	53.50	
Osman Behara	...	1300	18.57	1.43	1014	42.40	
Ram Ch. Datta	...	1250	17.86	1.43	1010	29.10	
Madan Fakir	...	1000	13.73	1.37	1012	28.00	
Sonaton Mandal	...	950	14.11	1.49	1020	44.30	
Bahadur Munshi	...	1250	15.71	1.26	1016	46.60	
Gonee Shaik	...	1000	20.00	2.00	1020	46.60	
Begum Chang	...	1150	19.71	1.71	1020	53.60	

			M.	E.
Temperature			86°	87°
Rainfall	...	...		0.00

18TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1250	27.14	2.17	1014	40.80	
Nanda Shaik ...	2150	17.20	.80	1010	50.10	
Osman Behara ...	950	10.54	2.06	1020	44.30	
Ram Ch. Datta ...	1700	19.43	1.14	1012	47.60	
Madan Fakir ...	950	18.46	1.94	1020	44.30	
Sonaton Mandal ...	1000	16.00	1.60	1020	46.60	
Gonee Shaik ...	1000	19.43	1.94	1020	46.60	
Bahadur Munshi ...	2250	28.29	1.26	1010	52.50	
Begum Chang ...	800	13.72	1.71	1020	37.30	

Temperature ... ... 86° 89°

Rainfall 0.00

19TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	800	14.63	1.82	1012	22.40	
Nanda Shaik ...	2000	22.86	1.14	1010	46.60	
Osman Behara ...	850	18.46	2.17	1022	43.60	
Ram Ch. Datta ...	2000	20.57	1.03	1010	46.60	
Madan Fakir ...	1000	34.29	3.4	1012	28.00	
Sonaton Mandal ...	1700	21.37	1.26	1012	47.60	
Bahadur Munshi ...	1750	48.00	2.70	1012	49.00	
Gonee Shaik ...	1100	30.11	1.82	1020	51.30	
Begum Chang ...	950	24.97	2.60	1020	44.30	

		M.	E.
Temperature ...	...	86°	89°
Rainfall ...	...	0.00	

20TH APRIL 1904.

		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	550	18.23	3.17	1024	30.80	
Nanda Shaik	...	2200	11.33	.51	1006	30.80	
Osman Behara	...	1050	1860	1.77	1020	49.00	
Ram Ch. Datta	...	1700	30.71	2.05	1020	79.30	
Madan Fakir	...	1250	21.43	1.71	1020	58.30	
Sonaton Mandal	...	1300	19.31	1.49	1012	36.40	
Bahadur Munshi	...	1350	23.14	1.71	1022	69.30	
Gonee Shaik	...	800	15.86	1.88	1020	37.30	
Begum Chang	...	950	15.20	160	1010	2210	

			M. E.
Temperature	...	...	86° 89°
Rainfall	...	...	0.00

21ST APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage in urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1100	21.37	1.94	1012	30.80	
Nanda Shaik ...	2350	16.11	.69	1008	43.80	
Osman Behara ...	1100	15.09	1.37	1014	35.90	
Ram Ch. Datta ...	2150	23.34	1.09	1010	50.10	
Madan Fakir ...	1450	14.91	1.03	1010	33.80	
Sonaton Mandal ...	1950	28.97	1.49	1012	54.60	
Bahadur Munshi ...	1350	16.97	1.26	1010	31.50	
Gonee Shaik ...	1150	22.34	1.94	1014	37.50	
Begum Chang ...	950	14.11	1.49	1014	31.00	

		M.	E.
Temperature ...	...	84°	86°
Rainfall ...	...	0.58	

22ND APRIL 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight
		c.c.	Grms.			Grms.	
Guru Charan	...	1015	23.20	2.28	1018	42.63	
Nanda Shaik	...	1850	17.97	.97	1008	34.50	
Osman Behara	...	1250	23.57	1.88	1018	52.50	
Ram Ch. Datta	...	1600	21.94	1.37	1010	37.30	
Madan Fakir	...	1000	17.14	1.71	1012	28.00	
Sonaton Mandal	...	1950	21.17	1.37	1006	27.30	
Bahadur Munssi	...	1300	30.46	2.31	1014	42.46	
Gonee Shaik	...	1000	20.57	2.06	1020	46.60	
Begam Chang	...	1150	18.40	1.6	1012	32.20	
Kani Shaik	...	1000	37.14	3.71	1026	60.60	
Rasik Lal De	...	1200	34.97	2.9	1020	56.00	

			M.	E.
Temperature	...	...	85°	87
Rainfall	...	...	0.00	

23RD APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1000	32.00	3.2	1020	46.60	
Nanda Shaik ...	950	16.83	1.77	1010	21.10	
Osman Behara ...	900	15.94	1.77	1018	37.80	
Ram Ch. Datta ...	1150	23.66	2.06	1012	32.20	
Madan Fakir ...	1700	18.46	1.37	1008	31.70	
Sonatan Mandal ...	1650	15.09	.91	1008	30.80	
Bahadur Munssi ...	1300	23.03	1.77	1012	36.90	
Gonee Shaik ...	700	19.20	2.74	1012	19.60	
Begam Chang ...	1000	13.14	1.31	1012	28.00	
Kani Shaik ...	150	13.29	8.86	1038	13.30	
Rasik Lal De ...	700	22.80	3.26	1020	32.60	

	M.	E.
Temperature	85°	87°
Rainfall	0.00	

24TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	550	15.40	1.8	1014	30.80	
Nanda Shaik ...	1550	15.94	1.03	1008	18.90	
Osman Behara ...	1000	19.43	1.94	1020	46.60	
Ram Ch. Datta ...	800	10.06	11.6	1010	18.60	
Madan Fakir ...	1500	22.29	1.54	1014	49.00	
Sonatan Mandal ...	1400	20.80	1.54	1010	32.60	
Bahadur Munssi ...	1300	35.66	1.74	1010	30.30	
Gonee Shaik ...	700	10.80	1.55	1018	29.40	
Begam Chang ...	1600	25.60	1.6	1014	52.20	
Kani Shaik ...	500	21.14	4.23	1020	23.30	
Rasik Lal De ...	1600	30.11	1.94	1010	37.30	

			M.	E.
Temperature	...	...	86°	87°
Rainfall	...	...	0·00	

25TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1150	28.91	3.2	1014	37.50	
Nanda Shaik ...	750	16.28	2.17	1012	21.00	
Osman Behara ...	1200	20.57	1.71	1012	33.60	
Ram Ch. Datta ...	1800	22.63	1.26	1010	42.00	
Madan Fakir ...	650	12.63	1.94	1020	30.30	
Sonaton Mandal ...	1700	15.54	.91	1010	39.60	
Bahadur Munshi ...	1400	20.00	1.43	1012	39.20	
Gonee Shaik ...	500	11.43	2.28	1016	18.60	
Begam Chang ...	850	14 57	1.71	1018	35.70	
Kani Shaik ...	1250	35.71	2.85	1020	58.30	
Rasik Lal De ...	1950	31.20	1.6	1010	45.50	

			M.	E.
Temperature	...	...	86°	88°
Rainfall	...	...	0.00	

26th APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1000	18.29	1.82	1014	32.60	
Nanda Shaik ...	950	14.11	1.48	1008	17.70	
Osman Behara ...	1300	20.06	1.54	1016	48.50	
Ram Ch. Datta ...	1600	14.63	1.48	1010	37.30	
Madan Fakir ...	1750	14.00	.8	1006	24.50	
Sonaton Mandal ...	1300	14.86	1.14	1010	30.30	
Bahadur Munshi ...	1550	21.26	1.37	1010	36.10	
Gonee Shaik ...	1200	20.57	1.71	1014	39.20	
Begum Chang ...	950	13.03	1.37	1014	31.00	
Kani Shaik ...	500	16.00	3.2	1016	18.60	
Rasik Lal De ...	1100	17.60	1.6	1022	56.46	

	M.	E.
Temperature	86°	89°
Rainfall	0.00	

27TH APRIL 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1250	24.29	1.94	1016	46.60	
Nanda Shaik ...	550	18.23	3.31	1024	30.80	
Osman Behara ...	600	21.26	3.54	1024	33.60	
Ram Ch. Datta ...	1950	24.51	1.26	1010	45.50	
Madan Fakir ...	1400	20.80	1.48	1010	32.60	
Sonaton Mandal ...	1950	17.83	.91	1010	45.50	
Bahadur Munshi ...	1700	31 09	1.82	1010	39 60	
Gonee Shaik ...	1000	29.71	2.97	1020	46.60	
Begum Chang ...	800	17.37	2.17	1020	37.30	
Kani Shaik ...	450	16.46	3.64	1026	27.30	
Rasik Lal De ...	1900	23.89	1.26	1008	35.46	

	M.	E.
Temperature	86°	89°
Rainfall	0.00	

28TH APRIL 1904

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	900	28·80	3·2	1020	42·00	
Nanda Shaik ...	1750	26·00	1·48	1010	40·80	
Osman Behara ...	750	22·29	2·96	1024	42·00	
Ram Ch. Datta ...	1000	20·57	2·06	1014	32·60	
Madan Fakir ...	700	15·20	2·17	1020	32·60	
Sonaton Mandal ...	950	13·03	1·37	1010	22·10	
Bahadur Munshi ...	1100	23·89	2·17	1010	25·60	
Gonee Shaik ...	900	24·69	2·7	1020	42·00	
Begum Chang ...	950	14·11	1·48	1026	44.30	
Kani Shaik ...	400	17·37	4·34	1028	26·10	
Rasik Lal De ...	750	15·43	2·03	1014	24·50	

		M.	E.
Temperature ...	...	87°	89°.
Rainfall ...	...	0·00	

29TH APRIL 1905.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	450	14.91	3.31	1020	21.00	
Nanda Shaik ...	1600	31.09	1.94	1008	29.80	
Osman Behara ...	900	25.71	2·85	1022	46.20	
Ram Ch. Datta ...	1650	22.63	1.37	1010	38.50	
Madan Fakir ...	1000	22.86	2 28	1016	37.30	
Sonaton Mandal ...	1200	16.46	1.37	1010	28.00	
Bahadur Munshi ...	1100	25·14	2.28	1012	30.80	
Gonee Shaik ...	1350	38.57	2.85	1020	63.00	
Begum Chang ...	750	11·14	1·48	1012	21·00	
Kani Shaik ...	350	18·80	5 23	1032	26·10	
Rasik Lal De ...	1850	29·60	1·6	1010	43.10	

	M.	E.
Temperature	86°	89°
Rainfall	00.0	

30TH APRIL 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		cc.	Grms.			Grms.	
Guru Charan	...	950	20·50	2·6	1020	44·30	
Nanda Shaik	...	1900	21·71	1·14	1010	44·30	
Osman Behara	...	1100	25·14	2·28	1020	51·30	
Ram Ch. Datta	...	1400	22·40	1.6	1012	39·20	
Madan Fakir	...	1700	25·24	1·54	1010	39·60	
Sonaton Mandal	...	1400	14·40	1·03	1010	32·60	
Bahadur Singh	...	1200	19·20	1·6	1018	50·40	
Gonee Shaik	...	1350	37·03	2·74	1010	31·50	
Begum Chang	...	1000	17.14	1·71	1016	37·30	
Kani Shaik	...	500	21·71	4·34	1028	32·60	
Rasik Lal De	...	1500	27·43	1·82	1014	49·00	

			M.	E.
Temperature	...	...	87°	89°
Rainfall	...	...	00·0	

1st May 1904.

Name.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	600	20.57	3.42	1020	28.00	116lbs.
Nanda Shaik ...	1450	16.57	1.14	1010	33.80	115 „
Osman Behara ...	950	31.49	3.31	1024	53.20	
Ram Ch. Datta ...	1200	17.83	1.54	1010	28.00	
Madan Fakir ...	1850	29.60	1.6	1010	43.10	117 „
Sonaton Mondal ...	1100	22.63	2.06	1018	46.20	98 „
Bahadur Munshi ...	1000	20.57	2·06	1016	37.30	96 „
Gonee Shaik ...	1100	36.46	3.31	1022	56.46	142 „
Begum Chang ...	950	13.03	1·37	1012	26·60	105 „
Kani Shaik ...	500	18·86	3·77	1028	32·60	128 „
Rasik Lal De ...	1050	21·60	2·06	1010	24·50	118 „

		M.	E.
Temperature	... ...	84°	89°
Rainfall	... ...	0.00	

2ND MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	950	26.06	2.74	1020	44.30	
Nanda Shaik ...	1150	18.40	1·6	1014	37.50	
Osman Behara ...	1300	29.71	2.28	1020	60.60	
Ram Ch. Datta ...	2300	30.23	1.31	1008	42.90	
Madan Fakir ...	1500	28.29	1.88	1010	35.00	
Sonaton Mandal ...	1450	18.23	1.26	1010	33.80	
Bahadur Munshi ...	1100	20.11	1.82	1010	25.60	
Gonee Shaik ...	1150	34.17	2.97	1026	69.70	
Begum Chang ...	950	18.46	1.94	1020	44.30	
Kani Shaik ...	550	24.51	4.44	1028	35.90	
Rasik Lal De ...	1000	20.57	2.06	1020	46.60	

	M.	E.
Temperature	86°	89°
Rainfall	0.00	

3RD MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight
	c.c.	Grms.			Grms.	
Guru Charan ...	700	26.40	3.77	1020	32.60	
Nanda Shaik ...	1700	15.54	.91	1008	31.70	
Osman Behara ...	1000	25.14	2.51	1020	46.60	
Ram Ch. Datta ...	600	10.29	1.71	1012	16.80	
Madan Fakir ...	1500	27.43	1.82	1010	35.00	
Sonatan Mandal ...	1400	20.80	1.48	1012	39.20	
Bahadur Munssi ...	950	15.20	1.6	1018	39.90	
Gonee Shaik						
Begam Chang ...	600	13.03	2.17	1020	28.00	
Kani Shaik ...	900	24.69	2.74	1018	37.80	
Rasik Lal De ...	600	13.03	2.17	1020	28.00	

		M.	E.
Temperature	... ...	87°	89°
Rainfall	... ...	0.00	

4TH MAY 1904

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight
	c.c.	Grms.			Grms.	
Guru Charan ...	400	30·17	7·54	1020	18 60	
Nanda Shaik ...	1100	12·57	1·14	1008	20·50	
Osman Behara ...	800	22·86	2.85	1020	37·30	
Ram Ch. Datta ...	1150	19·71	1·71	1010	26·80	
Madan Fakir ...	1400	30·40	2·17	1014	45·70	
Sonaton Mandal ...	1450	29·83	2·06	1014	47.30	
Bahadur Munssi ...	950	19.54	2·06	1012	26·60	
Gonee Shaik ...	1300	34·17	2·6	1018	54·60	
Began Chang ...	800	14.63	1 82	1012	22·40	
Rani Shaik ...	400	14.17	3 54	1014	13 00	
Rasik Lal De ...	1000	11.43	1.14	1022	51.30	

	M.	E.
Temperature	87°	89°
Rainfall	0·00	

5TH MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	500	22·29	4·4	1020	23·30	
Nanda Shaik ...	1000	19·43	1·94	1008	18·60	
Osman Behara ...	1650	28·29	1·71	1018	69·30	
Ram Ch. Datta ...	1250	25·71	2·06	1010	29·10	
Madan Fakir ...	1300	22·29	1·71	1014	42·46	
Sonatan Mandal ...	1550	23·03	1 48	1016	57·80	
Bahadur Munssi ...	1550	24·80	1·6	1014	50·60	
Goni Shaik ...	1250	30·00	2·4	1018	52·50	
Begam Chang ...	700	12·80	1·82	1012	19·60	
Kani Shaik ...	700	20.80	2.97	1016	26·10	
Rasik Lal De ...	1000	21.71	2.17	1020	46.60	

		M.	E.
Temperature ...	...	86°	89°
Rainfall ...	...	0·00	

6TH MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	400	13 71	3.43	1026	24.20	
Nanda Shaik ...	1300	16.34	1.26	1008	24 20	
Osman Behara ...	1100	23.89	2.17	1020	51.30	
Ram Ch. Datta ...	1500	15.43	1.03	1010	35.00	
Madan Fakir ...	1750	20.00	1.14	1010	40.80	
Sonaton Mandal ...	1300	19.31	1.54	1012	36.40	
Bahadur Munssi ...	2000	20.57	1.03	1010	46.60	
Gonee Shaik ...	900	20.57	2.28	1022	46.20	
Begam Chang ...	1250	12.85	1.03	1012	35.00	
Kani Shaik ...	950	22.80	2.4	1016	35.46	
Rassik Lal De ...	1800	26.74	1.54	1012	50.40	

	M.	E.
Temperature	80°	
Rainfall	1.36	

7TH MAY 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	1200	24·69	2·06	1012	33·60	
Nanda Shaik	...	1850	19·03	1·03	1008	34·50	
Osman Behara	...	1250	14.30	1.14	1010	29 50	
Ram Ch. Datta	...	1400	17·60	1·26	1008	26.10	
Madan Fakir	...	1250	14·30	1·14	1008	23 30	
Sonaton Mandal	...	2000	20·57	1·03	1010	46·60	
Bahadur Munshi	...	1950	15·60	·8	1006	27 30	
Gonee Shaik	...	1000	25·14	2·51	1018	42·00	
Begum Chang	...	1350	13.89	1.03	1010	31.50	
Kani Shaik	...	1900	19 54	1.03	1010	44.30	
Rasik Lal De	...	1500	13.71	.91	1008	28.00	

		M.	E.
Temperature	...	80°	
Rainfall	...	2.18	

8TH MAY 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	900	20.57	2.28	1018	37.80	117 lbs.
Nanda Shaik	...	1650	16.97	1.03	1010	38.50	114 ,,
Osman Behara	...	1100	25.41	2.28	1020	51.30	
Ram Ch. Datta	...	1400	22.40	1.6	1014	45.70	
Madon Fakir	...	1150	22.34	1.94	1014	37.50	118 ,,
Sonaton Mandal	...	1100	20.11	1.82	1014	35.90	100 ,,
Bahadur Munshi	...	1650	32.06	1.94	1012	46.20	97 ,,
Gonee Shaik	...	600	11.66	1.94	1014	19.60	143 ,,
Begum Chang	...	1000	10.29	1.03	1010	23.30	107 ,,
Kani Shaik	...	700	20.00	2.85	1020	32.60	130 ,,
Rasik Lal De	...	2350	24.17	1.03	1010	54.80	118 ,,

		M.	E.
Temperature ...	...	83°	87°
Rainfall ...	...		0.0°

9TH MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	500	11.43	2.28	1020	23.30	
Nanda Shaik ...	1400	17.60	1.26	1010	32.60	
Osman Behara ...	900	25.71	2.86	1020	21.00	
Ram Ch. Datta ...	900	14.40	1.6	1010	21.00	
Madan Fakir ...	1300	25.25	1.94	1010	30.30	
Sonaton Mandal ...	800	11.89	1.54	1012	22.40	
Bahadur Munshi ...	1000	18.29	1.82	1012	28.00	
Gonee Shaik ...	1300	20.80	1.6	1014	42.50	
Begum Chang ...	1050	13.20	1.26	1012	32.20	
Kani Shaik ...	400	16.00	4.00	1028	26.10	
Rasik Lal De ...	1250	27.14	2.17	1014	40.80	

			M.
Temperature	...	...	83°
Rainfall	...	...	0.34

10TH MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1000	16.00	1.6	1012	28.00	
Nanda Shaik ...	3000	17.14	·57	1008	56.00	
Osman Behara ...	1950	28.97	1.54	1010	43.10	
Ram Ch. Datta ...	950	15.20	1.6	1012	26.60	
Madan Fakir ...	1300	22.29	1.71	1014	42.50	
Sonaton Mandal ...	1400	11.20	.8	1010	32.60	
Bahadur Munshi ...	1300	17.83	1·37	1012	36.40	
Gonee Shaik ...	1250	17.14	1·37	1012	35·00	
Begum Chang ...	750	8.57	1.14	1012	19.60	
Kani Shaik ...	750	18.86	2.51	1020	35.40	
Rasik Lal De ...	1450	23.20	1.6	1012	40.60	

			M.
Temperature	...	...	83°
Rainfall	...	...	0.00

11TH MAY 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage in urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	1000	17.14	1.71	1016	37.30	
Nanda Shaik	...	1250	17.14	1.37	1012	35.00	
Madan Fakir	...	1500	24.00	1.6	1010	35.00	
Sonaton Mandal	...	900	13.37	1.54	1020	42.00	
Bahadur Munshi	...	1000	19.43	1.94	1012	28.00	
Gonee Shaik	...	850	14.57	1.71	1012	23.80	
Begum Chang	...	1000	9.14	·91	1010	23.30	
Kani Shaik	...	850	26.23	3.09	1014	27.70	
Rasik Lal De	...						

			M.	E.
Temperature	...	...	86°	
Rainfall	...	...	1.38	

12TH MAY 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	1000	22.86	2.28	1022	51.30	
Nanda Shaik	...	2500	20.00	.8	1008	46.60	
Madon Fakir	...	1000	13.71	1.37	1010	23.30	
Sonaton Mandal	...	950	15.20	1.6	1010	22.10	
Bahadur Munshi	...	1100	14.97	1.54	1012	30.80	
Gonee Shaik	...	1650	18.86	1.14	1012	46.20	
Begum Chang	...	1000	11.43	1.14	1012	28.00	
Kani Shaik	...	950	20.63	2.17	1016	35.50	
Rasik Lal De	...	1850	23.26	1.26	1010	43.10	

			M.
Temperature			79°
Rainfall	...	...	1.10

13TH MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1550	26.57	1.71	1012	43.40	
Nanda Shaik ...	1650	15 86	.91	1010	38.50	
Madan Fakir ...	1800	20.57	1.14	1010	42.00	
Sonaton Mandal ...	1850	21.14	1.14	1010	43.10	
Bahadur Munshi ...	1600	16.46	1.03	1012	44.80	
Gonee Shaik ...	700	14 40	2.06	1020	32.60	
Begum Chang ...	1300	16.33	1.26	1014	42.50	
Kani Shaik ...	1300	22.29	1.71	1012	36.40	
Rasik Lal De ...	1150	15.77	1.37	1010	26.80	

			M.
Temperature	...	...	78°
Rainfall	...	...	0.00

14TH MAY 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	1500	22.29	1.54	1012	42.00	
Nanda Shaik	...	2300	21.03	.91	1010	53.60	
Madon Fakir	...	1400	22.40	1.6	1010	32.60	
Sonaton Mandal	...	2000	16.00	.8	1010	46.60	
Bahadur Munshi	...	1900	17.37	.91	1010	44.30	
Gonee Shaik	...	1750	24.00	1.37	1012	49.00	
Begum Chang	...	1000	10 29	1.03	1010	23.30	
Kani Shaik	...	1150	17.08	1.48	1012	32.20	
Rasik Lal De	...	3650	29.20	.8	1010	85.10	

			M.
Temperature	...	...	80°
Rainfall	...	...	0.94

15TH MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...						116 lbs.
Nanda Shaik ...	1800	16.46	.91	1008	33.60	115 „
Madan Fakir ...	1300	23.77	1.82	1012	36.40	114 „
Sonatan Mandal ...	2000	13.71	.68	1010	23.30	100 „
Bahadur Munshi ...	1400	17.60	1.26	1010	32.60	97 „
Gonee Shaik ...	1650	28.29	1.71	1012	46.20	142 „
Begum Chang ...	1000	13.71	1.37	1016	37.30	104 „
Kani Shaik ...	1150	19.71	1.71	1012	32.20	128 „
Rasik Lal De ...	1450	16.57	1.14	1010	33.80	116 „

		M.
Temperature	... ...	83°
Rainfall	... ...	0.00

16th May 1904.

Name.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	600	17.83	2.96	1010	14.00	
Nanda Shaik	...	900	14.40	1.6	1012	25.20	
Madan Fakir	...	900	23 66	2.6	1016	33.60	
Sonaton Mandal	...	1750	24 00	1.37	1012	49.00	
Bahadur Munshi	...	800	11.89	1.50	1014	26.10	
Gonee Shaik	...	1000	17.14	1.71	1014	32.60	
Begum Chang	...	750	12.00	1.6	1012	21.00	
Kani Shaik	...	600	20.57	3.4	1020	28.00	
Rasik Lal De	...	2100	28.80	1.37	1010	49.00	

			M.
Temperature	...	...	86°
Rainfall	...	...	0.00

17TH MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	400	15.09	3.77	1028	26.10	
Nanda Shaik ...	1100	15.09	1.37	1014	35.90	
Madan Fakir ...	450	10.80	2.4	1018	18.90	
Sonaton Mandal ...	1500	18.86	1.26	1010	35.00	
Bahadur Munshi ...	750	17.14	2.28	1018	31.50	
Gonee Shaik ...	1000	17.14	1.71	1020	46.60	
Begum Chang ...	1000	12.56	1.26	1014	32.60	
Kani Shaik ...	950	30.40	3.2	1020	44.30	
Rasik Lal De ...	1100	30.17	2.7	1018	46.20	

	M.	E.
Temperature	87°	88°
Rainfall	0.00	

18TH MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	700	30.40	4.34	1028	45.70	
Nanda Shaik ...	750	17.14	2.28	1016	20.00	
Madon Fakir ...	1450	44.75	3.09	1018	60.90	
Sonaton Mandal ...	1000	16.00	1.6	1012	28.00	
Bahadur Munshi ...	1200	19.20	1.6	1012	33.60	
Gonee Shaik ...	1250	38.57	3.09	1020	58.30	
Begum Chang ...	1150	13.14	1.14	1010	26.80	
Kani Shaik ...	600	26.06	4.34	1024	33.60	
Rasik Lal De ...	1000	26.29	2.6	1018	42.00	

	M.	F.
Temperature	86°	88°
Rainfall	0.00	

19TH MAY 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		C.C.	Grms.			Grms.	
Guru Charan	...	350	11.20	3.20	1024	19.60	
Nanda Shaik	...	800	15.54	1.94	1020	37.30	
Madon Fakir	...	1400	30.40	2.17	1014	45.70	
Sonaton Mandal	...	1350	21.60	1.60	1012	37.80	
Bahadur Munshi	...	1250	17.14	1.37	1010	29.10	
Gonee Shaik	...	1400	28.80	2.06	1020	65.30	
Begum Chang	...	1150	19 71	1.71	1018	48.30	
Kani Shaik	...	800	29.26	3.66	1026	48.50	
Rasik Lal De	...	1550	31.89	2.06	1018	65.10	

			M.
Temperature	...	...	85°
Rainfall	...	...	0.00

20TH MAY 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	700	11 20	1.6	1022	35.90	
Nanda Shaik	...	600	14.40	2.40	1022	30.80	
Madan Fakir	...	1250	28.57	2.28	1016	46.60	
Sonaton Mandal	...	1350	27.77	2.06	1014	44.10	
Bahadur Munshi	...	1100	16.34	1.48	1014	35.90	
Gonee Shaik	...	800	20.11	2.51	1020	37.30	
Begum Chang	...	1150	17.09	1.48	1014	37.50	
Kani Shaik	...	750	27.43	3.6	1026	45.50	
Rasik Lal De	...	2950	37.09	1.26	1012	82.60	

			M.	E.
Temperature	...	...	83°	84°
Rainfall	...	...	4.17	

21ST MAY 1904.

Name.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	700	22.40	3.20	1020	32.60	
Nanda Shaik ...	1650	20.74	1.26	1012	46.20	
Madan Fakir ...	1300	23.77	1.82	1014	42.50	
Sonatan Mandal ...	1900	28.22	1.48	1010	44.30	
Bahadur Munshi ...	1700	23.31	1.37	1010	39.60	
Gonee Shaik ...	1350	32.40	2.40	1016	50.40	
Begum Chang ...	800	15.54	1.94	1016	29.80	
Kani Shaik ...	700	28.80	4.11	1024	39.20	
Rasik Lal De ...	1000	17.14	1.71	1014	34.60	

			M.
Temperature	...	...	84°
Rainfall	...	...	0.00

22ND MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1350	29.31	2.17	1014	44.10	115 lbs.
Nanda Shaik ...	1000	12.57	1.26	1008	18.60	114 „
Madan Fakir ...	1500	29.14	1 94	1012	42.00	117 „
Sonaton Mandal ...	1850	31.71	1.71	1010	43.10	98 „
Bahadur Munshi ...	1000	13.71	1.37	1012	28.00	98 „
Gonee Shaik ...	1650	35.83	2.17	1012	46.20	140 „
Begum Chang ...	1400	22.40	1.6	1012	39.20	107 „
Kani Shaik ...	1150	22.34	1 94	1018	48.30	126 „
Rasik Lal De ...	2000	27.43	1.37	1010	46.60	119 „

M.

Temperature ... ... 85°

Rainfall 0.15

23RD MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weights.
	c.c.	Grms.			Grms.	
Guru Charan ...	950	32.57	3.43	1020	4430	
Nanda Shaik ...	900	17.49	1.94	1018	37 80	
Madan Fakir ...	1000	27.43	1.74	1020	46.60	
Sonaton Mandal ...	2100	28.80	1.37	1008	39.20	
Bahadur Munshi ...	850	15.54	1.82	1014	27.70	
Gonee Shaik ...	1100	2389	2.17	1014	35.90	
Begum Chang ...	1250	14.29	1.14	1014	40.80	
Kani Shaik ...	700	26.40	3.77	1020	32.60	
Rasik Lal De ...	1350	23.91	1.77	1014	44.10	

M

Temperature ... ... 85°

Rainfall 0.00

24TH MAY 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		cc.	Grms.			Grms.	
Guru Charan	...	550	22·00	4·0	1022	28·30	
Nanda Shaik	...	1250	24·29	1·94	1012	35·00	
Madan Fakir	...	1000	24·00	2·4	1014	32·60	
Sonaton Mandal	...	1250	25·71	2.06	1012	35·00	
Bahadur Munshi	...	1250	31·43	2·51	1018	52·50	
Gonee Shaik	...	650	20·06	3·09	1018	27·30	
Begum Chang	...	1400	20·80	1·49	1014	45·70	
Kani Shaik	...	450	25·20	5·6	1030	31·50	
Rasik Lal De	...	1250	17.14	1·37	1014	40·80	

			M.
Temperature	...	...	86°
Rainfall	...	...	0·46

25TH MAY 1905.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	800	25.60	3.20	1014	26.10	
Nanda Shaik ...	1800	16 46	.91	1008	33.60	
Madan Fakir ...	1600	25.60	1·6	1008	29.80	
Sonaton Mandal ...	1900	34.74	1.83	1014	39.90	
Bahadur Munshi ...	1600	21.94	1.37	1010	37.30	
Gonee Shaik ...	1500	32.57	2.17	1016	56.00	
Begum Chang ...	800	14·63	1.83	1014	26.10	
Kani Shaik ...	1150	34.17	2.97	1012	32.20	
Rasik Lal De ...	1750	26·00	1·49	1010	40·80	

		M.
Temperature	... ...	86°
Rainfall	... ...	1,27

26TH MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	900	27·77	3·09	1020	42·00	115 lbs.
Nanda Shaik ...	1400	25·60	1·83	1008	26.10	114 lbs.
Madan Fakir ...	900	22.60	2.51	1018	37.80	118 ,,
Sonaton Mandal ...	1500	29·14	1·94	1014	49·00	98 ,,
Bahadur Munshi ...	2000	20·57	1·03	1008	37·30	99 ,,
Gonee Shaik ...	2000	34·29	1·71	1010	46·60	144 ,,
Begum Chang ...	1000	16·00	1·6	1012	28 00	106 ,,
Kani Shaik ...	2000	36·57	1·83	1010	46·46	129 ,,
Rasik Lal De ...	2200	30.17	1.37	1010	51.30	117 ,,

	M.
Temperature ...	85°
Rainfall ...	0.84

27TH MAY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight
	c.c.	Grms.			Grms.	
Guru Charan ...	1200	24.69	2.06	1014	39.20	
Nanda Shaik ...	2700	21 00	.80	1004	25.20	
Madan Fakir ...	1900	28.29	1.54	1008	35.50	
Sonaton Mandal ...	2000	20.57	1.03	1010	46.60	
Bahadur Munssi ...	2500	31 43	1.26	1010	58.30	
Gonee Shaik ...	1000	20.57	2.06	1014	32.60	
Begam Chang ...	1000	12.57	1.26	1010	23.30	
Kani Shaik ...	1650	30.14	1.82	1010	38.50	
Rasik Lal De ...	1700	23.32	1.37	1012	47.60	

	M.
Temperature	85°
Rainfall	0.46

28TH MAY 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		C.C.	Grms.			Grms.	
Guru Charan	...	1100	23·89	2·17	1014	35 90	
Nanda Shaik	...	2100	24·00	1·14	1004	19·60	
Madan Fakir	...	1150	24·97	2·17	1012	26·30	
Sonaton Mondal	...	2000	25·14	1·26	1010	46·60	
Bahadur Munshi	...	1700	25·26	1·54	1010	39·60	
Gonee Shaik	...	1400	25·60	1·82	1010	32·60	
Begum Chang	...	1200	16·46	1·37	1010	28·00	
Kani Shaik	...	2000	32·00	1·82	1010	46·60	
Rasik Lal De	...	2200	27·66	1·26	1012	61·60	

			M.
Temperature	...	...	85°
Rainfall	...	...	0·40

29TH MAY 1904

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	2000	20·57	1·03	1006	18·00	114 lbs.
Nanda Shaik ...	2600	20·80	·80	1004	24·20	115 ,,
Madan Fakir ...	1700	25·26	1·49	1008	31·70	117 ,,
Sonaton Mandal ...	2150	22·11	1 03	1008	40·70	98 ,,
Bahadur Munshi ...	2150	22·11	1·03	1008	40·70	97 ,,
Gonee Shaik ...	2800	32·00	1·14	1006	39·20	143 ,,
Begum Chang ...	1400	11·20	1·37	1010	32·60	105 ,,
Kani Shaik ...	1700	29·14	1·71	1010	39·60	127 ,,
Rasik Lal De ...	2600	29·71	1·14	1010	69·60	115 ,,

M.

Temperature ... ... 85°

Rainfall ... ... 0·00

30TH MAY 1904

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight
	c.c.	Grms.			Grms.	
Guru Charan ...	500	13·71	2·7	1020	23·30	113 lbs.
Nanda Shaik ...	1200	16·46	1·37	1012	33·60	117 ,,
Madan Fakir ...						116 ,,
Sonaton Mandal ...	1150	17·60	1·6	1012	31·00	98 ,,
Bahadur Munshi ...	2000	32·00	1·6	1010	46·60	97 ,,
Gonee Shaik ...	400	8·23	2·06	1016	14·90	141 ,,
Begam Chang ...	1200	15·09	1·26	1012	33·60	104 ,,
Kani Shaik ...	650	18·57	2·86	1018	27·30	126 ,,
Rasik Lal De ...	1900	34·74	1·82	1010	44·30	115 ,,

	M.
Temperature	87°
Rainfall	0.00

31ST MAY 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight
		c.c.	Grms.			Grms.	
Guru Charan	...	300	9·25	3·09	1022	15·40	
Nanda Shaik	...	1500	25·72	1·71	1012	42·00	
Madan Fakir	...	1000	26·29	2·6	1016	37·30	
Sonatan Mandal	...	1450	21·74	1·48	1010	33·80	
Bahadur Munssi	...	2000	25·14	1·26	1010	46·60	
Gonee Shaik	...	1500	27·43	1·82	1012	42·00	
Begam Chang	...	1250	17·14	1·37	1010	29·10	
Kani Shaik	...	550	20·11	3·6	1022	28·30	
Rasik Lal De	...	1650	35·83	2·17	1014	53·90	

			M.
Temperature	...	...	87°
Rainfall	...	...	0.00

1st June 1904.

Name.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	C.C.	Grms.			Grms.	
Guru Charan ...	300	13·71	4·6	1020	14·00	
Nanda Shaik ...	1000	13·71	1·37	1012	28·00	
Madan Fakir ...	1100	20·11	1·82	1014	35 90	
Sonatan Mandal ...	1200	16·46	1·37	1010	28·00	
Bahadur Munshi ...	1300	22·29	1·71	1016	48·50	
Goni Shaik ...	850	27·20	3·20	1018	35·70	
Begam Chang ...	1550	21·26	1·37	1012	43·40	
Kani Shaik ...	800	22·86	2·86	1018	33·60	
Rasik Lal De ...	950	15·20	1·6	1016	35·50	

			M.
Temperature	...	...	87°
Rainfall	...	...	0.00

2ND JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	250	10·28	4·11	1024	14·00	
Nanda Shaik ...	900	16·46	1·82	1014	29·40	
Madan Fakir ...	1300	25·26	1·94	1012	36·40	
Sonaton Mandal ...	900	16·46	1·82	1012	25·20	
Bahadur Munshi ...	1200	17·83	1·49	1010	28·00	
Gonee Shaik ...	1000	26·29	2·6	1016	37·30	
Begum Chang ...	1050	15·60	1·49	1016	39·20	
Kani Shaik ...	750	25·71	3·43	1020	35·00	
Rasik Lal De ...	1500	25·71	1·71	1014	49·00	

		M.
Temperature ...	...	87°
Rainfall ...	...	0·00

3RD JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	600	26·06	4·34	1016	22·40	113lbs.
Nanda Shaik ...	1550	21·26	1·37	1010	36·10	116 ,,
Madan Fakir ...	1600	32·91	1·54	1010	37·30	118 ,,
Bahadur Munssi ...	650	10·40	1·6	1014	21·30	98 ,,
Gonee Shaik ...	1300	25·26	1·94	1016	48·50	143 ,,
Begam Chang ...	1000	14·86	1·54	1014	32·60	101 ,,
Kani Shaik ...	1000	25·14	2·51	1018	42·00	128 ,,
Rassik Lal De ...	1000	26·06	1·37	1016	70 90	117 ,,

	M.
Temperature	86°
Rainfall	0.00

4TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	450	22·63	3·03	1018	18·90	
Nanda Shaik ...	1150	19·71	1·71	1008	21·50	
Madan Fakir ...	1200	28·80	2·40	1012	33·60	
Bahadur Munshi ...	850	14·57	1·71	1014	27·70	
Goni Shaik ...	1500	30·86	2·06	1018	63 00	
Begum Chang ...	1000	19·43	1·94	1014	32·60	
Kani Shaik ...	650	28·23	4·34	1018	27·30	
Rasik Lal De ...	2200	27·66	1·26	1016	82·10	

M.

Temperature 88°

Rainfall 0,00

5TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	400	19·66	4·91	1026	24·20	112 lbs.
Nanda Shaik ...	600	14·40	2·4	1020	28·00	117 ,,
Madan Fakir ...	650	17·83	2·74	1018	27·30	117 ,,
Bahadur Munshi ...	1100	28·91	2·6	1018	46·20	92 ,,
Goni Shaik ...	850	28·17	3·31	1016	31·70	140 ,,
Begum Chang ...	450	20 06	4·46	1030	31·50	96 ,,
Kani Shaik ...	600	32·23	5·37	1022	30·80	126 ,,
Rasik Lal De ...	1400	27 20	1·94	1010	32·60	114 ,,

		M.
Temperature	... ...	89°
Rainfall	...	0.00

6TH JUNE 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...						
Nanda Shaik	...	800	21·03	2·6	1014	26·10	
Madan Fakir	...	1000	21·71	2·17	1012	·28·00	
Bahadur Munshi	...	150	8·41	5 6	1012	42·00	
Gonee Shaik	...	800	28·34	3·54	1016	29·80	
Begam Chang	...	400	22·85	5·71	1016	14·90	
Kani Shaik	...	500	29 28	4·4	1028	32 60	
Rasik Lal De	...	1000	26·28	2·6	1016	37·30	

			M.
Temperature	...	...	90
Rainfall	...	...	0.00

7TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	300	13·71	4·6	1030	21·00	
Nanda Shaik ...	1150	19·71	1·71	1012	32·20	
Madan Fakir ...	800	22·86	2·86	1022	41·00	
Bahadur Munshi ...	600	26·74	4·5	1018	25·20	
Gonee Shaik ...	800	29·26	3·6	1018	33·60	
Begam Chang ...	900	29·83	3·31	1024	50·40	
Kani Shaik ...	600	22·63	3·77	1018	25·20	
Rasik Lal De ...	1550	26 57	3·71	1014	50·60	

			M.
Temperature	...	...	87°
Rainfall	...	...	0.00

8TH JUNE 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
Guru Charan	...	500	17·71	3·54	1020	23·30	
Nanda Shaik	...	1400	20·80	1·48	1010	32·60	
Madan Fakir	...	1400	35·20	2·51	1016	52·20	
Bahadur Munshi	...	10 0	25·14	2·51	1014	32·60	
Goni Shaik	...	1000	21·71	2·17	1012	28·00	
Begum Chang	...	900	17·49	1 94	1016	33·60	
Kani Shaik	...	700	25·60	3·66	1018	29 40	
Rasik Lal De	...	2200	22 63	1·03	1006	30.80	

			M.	E.
Temperature	...	...	85°	87°
Rainfall	...	...	0.00	

9TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1200	21 94	1.83	1010	28.00	
Nanda Shaik ...	2500	22.86	.91	1006	35.00	
Bahadur Munshi ...	2000	22.86	1.14	1008	37.30	
Gonee Shaik ...	1800	28.80	1.82	1012	50.40	
Begum Chang ...	1200	27.43	2.28	1014	39.20	
Rasik Lal De ...	2500	25.71	1.03	1010	58.30	

	M.
Temperature	83°
Rainfall	0.15

10TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1800	24.69	1.37	1008	33.60	
Nanda Shaik ...	1400	8.00	.57	1010	32.60	
Madan Fakir ...	1600	18.29	1.14	1008	29.80	
Bahadur Munshi ...	2200	20.11	.91	1006	30.80	
Gonee Shaik ...	2300	23.66	1.03	1010	53.60	
Begum Chang ...	2400	10.97	.46	1010	56.00	
Kani Shaik ...	2100	21.60	1.03	1008	39.20	
Rasik Lal De ...	2900	23.20	.8	1010	67.60	

	M.
Temperature	83°
Rainfall	0.80

11TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1700	17.49	1.03	1008	31.70	
Nanda Shaik ...	2650	15.14	.6	1006	37.10	
Madon Fakir ...	1700	21.37	1.26	1008	31.70	
Bahadur Munshi ...	2500	14.29	.6	1006	35.00	
Gonee Shaik ...	2150	17.20	.8	1008	40.10	
Begum Chang ...	1500	12.00	.8	1010	35.00	
Kani Shaik ...	2300	15.77	.68	1008	42.90	
Rasik Lal De ...	2400	16.46	.68	1010	56.00	

		M.
Temperature	... ...	83°
Rainfall	... ...	0.60

12TH JUNE 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	2100	27.43	.91	1006	29.40	113 lbs.
Nanda Shaik	...	2500	22.86	.91	1006	35.00	116 ,,
Madan Fakir	...	1900	19.54	1.03	1006	26.60	116 ,,
Bahadur Munshi	...	2200	20.11	.91	1004	30.50	97 ,,
Gonee Shaik	...	2200	15.09	.68	1006	30.80	142 ,,
Begum Chang	...						101 ,,
Kani Shaik	...	2250	18.00	.8	1004	21.00	129 ,,
Rasik Lal De	...	2350	18.80	.8	1008	43.80	115 ,,

			M.
Temperature	...	...	83°
Rainfall	...	...	0.44

13TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1000	17.14	1.71	1006	14.00	
Nanda Shaik ...	1850	12.80	·8	1004	17.26	
Madan Fakir ...	1600	20.11	1.26	1008	29.80	
Bahadur Munshi ...	2100	21.60	1·03	1006	29.40	
Gonee Shaik ...	2000	16.00	·8	1008	37·30	
Begum Chang ...	1350	7.71	·6	1010	31.50	
Kani Shaik ...	1600	16.46	1.03	1008	29.80	
Rasik Lal De ...	2150	17.20	.8	1006	30.10	

	M.
Temperature	85°
Rainfall	0.00

14TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	750	15.43	2.06	1016	28.00	
Nanda Shaik ...	1250	15.71	1.26	1008	23.30	
Madan Fakir ...	600	15.77	2.6	1016	22.40	
Bahadur Munshi ...	1300	25.26	1.94	1010	30 30	
Gonee Shaik ...	750	12.86	1.71	1012	21.00	
Begum Chang ...	1300	12.86	.8	1008	24.20	
Kani Shaik ...	1050	18.00	1.71	1012	29.40	
Rasik Lal De ...	2400	24.69	1.03	1008	44.80	

			M.
Temperature	...	...	86°
Rainfall	...	...	0.00

15TH JUNE 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage in urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	300	9.25	3.09	1024	16.80	
Nanda Shaik	...	900	17.49	1.94	1010	21.00	
Madan Fakir	...	750	23.14	3.09	1016	28.00	
Bahadur Munshi	...	1500	29.14	1.94	1010	35.00	
Gonee Shaik	...	1650	18.86	1.14	1008	30.80	
Begum Chang	...	1400	19.20	1·37	1014	45.70	
Kani Shaik	...	1100	21.37	1.94	1010	25.60	
Rasik Lal De	...	600	15.09	2.51	1012	16.80	

			M.	E.
Temperature	...	...	86°	
Rainfall	...	...	0.00	

16TH JUNE 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
		C.C.	Grms.			Grms.	
Guru Charan	...	350	10.80	3.09	1022	17.90	
Nanda Shaik	...	1550	23.03	1.5	1008	28.90	
Madon Fakir	...	800	26.51	2.17	1014	28.90	
Bahadur Munshi	...	1800	24.69	1.37	1010	42.00	
Gonce Shaik	...	1500	22.29	1.5	1012	42.00	
Begum Chang	...	2250	15.43	.68	1010	52.50	
Kani Shaik	...	1100	27.66	2.51	1016	41.00	
Rasik Lal De	...	2050	35.14	1.71	1008	38.20	

			M.
Temperature			84°
Rainfall	...	...	0.20

17TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1200	27.43	2.28	1014	39.20	
Nanda Shaik ...	2500	25.71	1.03	1008	46.60	
Madon Fakir ...	1600	25.60	1.6	1010	37.30	
Bahadur Munshi ...	1950	22.29	1.14	1008	36.40	
Gonee Shaik ...	2550	29.14	1.14	1006	35.70	
Begum Chang ...	1000	12.57	1.26	1012	28.00	
Kani Shaik ...	1800	24.69	1.37	1008	33.60	
Rasik Lal De ...	2200	27.66	1.26	1010	51.30	

	M.
Temperature	86°
Rainfall	2.15

18TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight
	c.c.	Grms.			Grms.	
Guru Charan ...	1700	27.20	1.6	1010	39.60	
Nanda Shaik ...	2200	22.63	1.03	1006	30.80	
Madan Fakir ...	1600	31.09	1.94	1010	37.30	
Bahadur Munshi ...	1950	17.83	.91	1008	36.40	
Gonee Shaik ...	2350	24.17	1.03	1008	43.80	
Begum Chang ...	1600	14.63	.91	1008	29.80	
Kani Shaik ...	1950	26.74	1.37	1008	36.40	
Rasik Lal De ...	2400	19.20	.8	1006	33.60	

		M.
Temperature	... ...	85°
Rainfall	... ...	0.07

19TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1700	27.20	1.6	1010	39.60	115 lbs.
Nanda Shaik ...	1300	17.83	1.37	1008	34 20	118 „
Madan Fakir ...	900	22.63	2.51	1010	21.00	119 „
Bahadur Munshi ...	1400	17.60	1.26	1010	32.60	96 „
Gonee Shaik ...	1450	23.20	1.6	1010	33.80	142 „
Begum Chang ...	1450	13.26	.91	1008	27.00	104 „
Kani Shaik ...	1300	22.29	1.71	1010	30.30	129 „
Rasik Lal De ...	1800	20.57	1.14	1008	33.60	112 „

		M.
Temperature	... ...	85°
Rainfall	... ...	0.12

20TH JUNE 1904.

Name.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1200	19.20	1.6	1010	28.00	
Nanda Shaik ...	2150	19.66	.91	1006	30.00	
Madon Fakir ...	1100	16.34	1.5	1010	25.60	
Bahadur Munshi ...	1300	16.34	1.26	1010	30.30	
Gonee Shaik ...	1800	26.74	1.5	1010	42.00	
Begum Chang ...	1500	12.00	.8	1008	28.00	
Kani Shaik ...	1600	18.29	1.14	1010	37.30	
Rasik Lal De ...	2150	22.11	1.03	1010	50.10	

			M.
Temperature	...	...	85°
Rainfall	...	...	0.15

21ST JUNE 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	700	12.00	1.71	1012	19.60	115 lbs.
Nanda Shaik	...	2100	14.40	.6	1006	29.40	118 ,,
Madan Fakir	...	2200	27.66	1.26	1004	20.50	116 ,,
Bahadur Munshi	...						98 ,,
Gonec Shaik	...	1200	15.09	1.26	1010	28.00	141 ,,
Begum Chang	...	1400	8.00	.57	1006	19.60	104 ,,
Kani Shaik	...	1800	18.51	1.03	1006	31.20	127 ,,
Rasik Lal De	...	1750	25.71	1.14	1008	34.60	115 ,,

			M.
Temperature	...	...	85°
Rainfall	...	...	1.00

22ND JUNE 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	1500	30.86	1.5	1010	35.00	
Nanda Shaik	...	2700	21.60	.8	1006	37.80	
Madon Fakir	...	1800	26.74	1.5	1010	42.00	
Bahadur Munshi	...						
Gonee Shaik	...	2000	25.14	1.26	1010	46.60	
Begum Chang	...	1100	10.06	.91	1012	30.30	
Kani Shaik	...	1750	26.00	1.5	1010	40.80	
Rasik Lal De	...	2350	18.80	.8	1008	43.80	
					M.		
Temperature		..		...	86°	..	
Rainfall		...		...	0.10		

23RD JNUE 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids. gramme.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	1200	20.57	1.71	1010	28.00	
Nanda Shaik	...	2400	19 20	.8	1006	33.60	
Madan Fakir	...	1200	23.31	1.94	1012	33.60	
Bahadur Munshi	...						
Gonee Shaik	...	1600	23 77	1.5	1010	37.30	
Begum Chang	...	1350	13.89	1.03	1008	25.20	
Kani Shaik	...	900	15.42	1.71	1010	21.00	
Rasik Lal De	...	2150	19.66	.91	1010	50.10	

			M.
Temperature	...	...	86°
Rainfall	...	...	0.20

24TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours. c.c.	Total quantity of urea passed in 24 hours. Grms.	Percentage of urea.	Specific gravity.	Total Solids. Grms.	Weight.
Guru Charan ...	1450	24.86	1.71	1010	33.80	
Nanda Shaik ...	2150	19.66	.91	1006	30.10	
Madan Fakir ...	1100	18.86	1.71	1008	20.50	
Bahadur Munshi ...						
Gonee Shaik ...	2350	26.86	1.14	1008	43.80	
Begum Chang ...	1500	17.14	1.14	1010	35.00	
Kani Shaik ...	1150	23.66	2.06	1012	32.20	
Rasik Lal De ...	3200	21.94	.6	1006	44.80	

			M.
Temperature	...	...	85°
Rainfall	...	...	0.43

25TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight
	c.c.	Grms.			Grms.	
Guru Charan ...	500	17·43	3·09	1024	28·00	
Nanda Shaik ...	1250	20·00	1·6	1010	29·10	
Madan Fakir ...	950	23·89	2·51	1016	35·50	
Bahadur Munssi ...						
Gonee Shaik ...	1000	24·00	2·4	1016	37·30	
Begam Chang ...	1350	10·80	·8	1008	25·20	
Kani Shaik ...	1100	26·40	3·4	1014	35·90	
Rasik Lal De ...	2300	31·54	1·37	1010	53·60	

	M.
Temperature	86°
Rainfall	0.00

26TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	800	22·86	2·86	1020	37·30	115 lbs.
Nanda Shaik ...	1450	18·23	1·26	1008	27·00	116 ,,
Madan Fakir ...	1400	19·20	1·37	1008	26·10	118 ,,
Bahadur Munshi ...						98 ,,
Goni Shaik ...	1550	33·66	2·17	1012	43·40	141 ,,
Begum Chang ...	1500	10·29	·6	1010	35·00	105 ,,
Kani Shaik ...	900	28·80	3·2	1016	33·60	127 ,,
Rasik Lal De ...	1350	16·97	1·26	1010	31·50	115 ,,

	M.
Temperature	89°
Rainfall ...	0.00

27TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	cc.	Grms.			Grms.	
Guru Charan ...	950	26·06	2·74	1016	35·50	
Nanda Shaik ...	1500	18·86	1·26	1008	28·00	
Madan Fakir ...	1900	30·40	1·6	1012	53·20	
Bahadur Munshi ...						
Gonee Shaik ...	1600	23·77	1·48	1010	37·30	
Begum Chang ...	1100	21·09	1·94	1014	35·90	
Kani Shaik ...	2050	46·86	2·28	1012	57·40	
Rasik Lal De ...	1700	29.14	1·71	1012	47·60	

		M.
Temperature	... ...	86°
Rainfall	... ...	0·12

28TH JUNE 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	1350	26·23	1·94	1012	37·80	
Nanda Shaik	...	1550	21·26	1·37	1010	36·10	
Madan Fakir	...	1100	20·11	1·82	1016	41 00	
Bahadur Munshi	...						
Goni Shaik	...	1200	24·69	2·06	1014	39·20	
Begam Chang	...	750	13·71	1·82	1018	31·50	
Kani Shaik	...	1450	29·83	2·06	1014	47·30	
Rasik Lal De	...	2800	41·60	1·54	1010	65·30	

			M.
Temperature	...	...	86°
Rainfall	...	...	0.00

29TH JUNE 1904

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1100	21·37	1·94	1014	35·90	
Nanda Shaik ...	1850	23·26	1·26	1012	51·80	
Madan Fakir ...	1350	21.60	1·6	1012	37·80	
Bahadur Munshi ...						
Gonce Shaik ...	750	22·29	2·97	1014	24·50	
Begam Chang ...	1550	19·49	1·26	1010	36·10	
Kani Shaik ...	1000	24·00	2·4	1014	34·60	
Rasik Lal De ...	1450	26·51	1·82	1012	40·60	

	M.
Temperature	86°
Rainfall	0.05

30TH JUNE 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	600	11·06	2·6	1014	19 60	
Nanda Shaik ...	1600	18·29	1·14	1008	29·80	
Madan Fakir ...	1350	23·14	1·71	1012	37·80	
Bahadur Munshi ...						
Gonee Shaik ...	1200	17·83	1·5	1010	28·00	
Begum Chang ...	1300	11·89	·91	1010	30·30	
Kani Shaik ...	1000	27·43	2·74	1016	37·30	
Rasik Lal De ...						

		M.
Temperature	...	... 86°
Rainfall	...	... 0·08

1ST JULY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	450	12·34	2·74	1020	21·00	
Nanda Shaik ...	2550	26·23	1·03	1008	47.60	
Madan Fakir ...	1350	30·86	2·28	1018	56·70	
Bahadur Munshi ...						
Gonee Shaik ...	1400	25·60	1·82	1014	45·70	
Begum Chang ...	1500	15·43	1·03	1012	42 00	
Kani Shaik ...	1150	23·66	2·06	1014	37·50	
Rasik Lal De ...	1800	22·63	1·25	1014	47·10	

	M.
Temperature ...	85°
Rainfall ...	0.05

2ND JULY 1904.

NAME.	Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
	c.c.	Grms.			Grms.	
Guru Charan ...	1400	25·60	1·82	1010	32·60	
Nanda Shaik ...	1900	19·54	1·03	1008	35·50	
Madan Fakir ...	950	22·80	2·4	1016	35·50	
Bahadur Munshi ...						
Goni Shaik ...	1100	15·09	1·37	1008	20·50	
Begum Chang ...	650	14·86	1·94	1022	33·30	
Kani Shaik ...	1000	21·71	2·17	1014	32·60	
Rasik Lal De ...	1700	17·49	1·03	1012	47·60	

	M.
Temperature	85°
Rainfall	0,22

3RD JULY 1904.

NAME.		Total quantity of urine passed in 24 hours.	Total quantity of urea passed in 24 hours.	Percentage of urea.	Specific gravity.	Total Solids.	Weight.
		c.c.	Grms.			Grms.	
Guru Charan	...	1100	22 63	2·06	1012	30·80	
Nanda Shaik	...	1900	23·89	1·26	1008	35·50	
Madan Fakir	...	1000	22·86	2·28	1016	37·30	
Bahadur Munshi	...						
Goni Shaik	...	900	17·49	1·94	1010	21 00	
Begum Chang	...	1400	17·60	1·26	1020	65·30	
Kani Shaik	...	850	15·54	1·82	1014	27·70	
Rasik Lal De	...	2200	17·60	·8	1012	61·60	

		M.
Temperature		86°
Rainfall	...	... 0,02

APPENDIX IV.

Admission of Dysentery cases in the Khulna Dispensary during 5 years, according to months.

Month.		1899	1900	1901	1902	1903
January	...	15	28	35	19	31
February	...	16	24	6	18	14
March	...	13	9	12	28	29
April	...	22	16	15	19	13
May	...	6	19	14	16	10
June	...	7	6	26	20	15
July	...	15	19	16	45	40
August	...	26	29	26	19	19
September	...	21	15	26	40	20
October	...	27	28	40	41	38
November	...	40	26	28	53	32
December	...	32	22	17	31	32
Total	...	240	241	261	349	293

Analysis of Urine of dysentery cases.

APPENDIX V.

	Total quantity of urine passed in 24 hrs.	Total quantity of urea passed in 24 hrs.	Percentage of urea.	Specific gravity.	Date.
	cc.	Grms.			
	12 hrs.				
Rai Ch. Biswas ...	493	14·09	2·86	1020	22-3-04
Kali Shaik ...	870	13·92	1·60	1008	22-3-04
	12 hrs.				
Bahadur Kazi ...	261	5·07	1·94	1022	23-3-04
	12 hrs.				
Rajoni Muchi ...	101	4·96	4·91	1020	25-3-04
Adiloddi Jamadar	625	6·52	·91	1006	25-3-04
Panchu Shaik ...	575	8·26	1·26	1006	6-4-04
Jharu Gazi ...	475	3·09	·57	1000	6-4-04
Asrop Fakir ...	475	9·94	1·83	1008	6-4-04
Golamali Kazi ...	550	8·61	1·37	1002	6-4-04
Tofez Karikar ...	500	5 87	1·03	1004	6-4 04
Abdul Jaffer ...	500	7·84	1·37	1000	6 4-04
Narottam Muchi ...	87	3·73	4·28	1018	19-4·04
Johar Shaik ...	188	7·38	4·23	1022	19-4-04
Rahaman Karikar	275	13·85	5·14	1024	19-4-04
Goyjaddi Shaik ...	377	25·99	6·51	1030	19-4-04
Panchu Molla ...	391	27·25	6·97	1026	20-4-04
Momrej Sardar ...	623	10·32	1·66	1002	20-4-04
	12 hrs.				
Uzir Biswas ...	32	1·64	5·14		21-4-04

Analysis of Urine of dysentery cases.

	Total quantity of urine passed in 24hrs.	Total quantity of urea passed in 24hrs.	Percentage of urea.	Specific gravity.	Date.
	cc.	Grms.			
Abdul Kazt ...	58	3·05	5·26	1016	21.4-04
Amjadali ...	145	8·45	5·83	1024	22-4-04
Dwaric Mandal ...	630	7·92	3·31	1004	22-4-04
Sital Rishi ...	304	21·19	6 97	1026	20-5-04
Punchu Shaik ...	261	15·21	5·83	1030	20-5-04
Mea Khan ...	681	14·01	2·06	1004	20-5-04
Adu Khan ...	609	7·56	2·06	1006	20-5-04
Siraj Gazi ...	420	14·40	3·43	1020	20-5-04
	12 hrs.				
Nezam Shaik ...	102	6·06	5·94	1030	27-5-04
	12 hrs.				
Ahadulla Shaik ...	420	3·36	1·49	1002	27-5-04
Abdul Jabbar Sheik	450	9·77	3·77	1006	27-5-04
	12 hrs.				
Basanta Patni ...	34	1·59	4·69	could not be taken.	27-5-04

APPENDIX VI.

FIRST DAY.

Breakfast.	*Tiffin.*	*Dinner.*
Porridge	Chicken	Julienne Soup.
Fried silver fish	Mutton Galantine	Fried silver fish.
Cold Ham	Cold Tongue	Tongue Glace.
Eggs to order	Cold Beef	Roast Fowl & Tongue
	Apricot Cream Tart	Roast Sirloin of Beef.
		Ginger Pudding.
		Macedoine Jelly.
		Scotch Woodcock on Toast.

SECOND DAY.

Porridge	Braised Duck	Royal Soup.
Fish	Vegetable Curry and Rice	Braised Beckti.
Liver and Bacon.	Cold Tongue	Chicken Cromesquis.
	Cold Beef.	Roast leg of Mutton.
	Bread and Butter-Pudding	Roast Rib of Beef.
		Iced Meringues.
		Fruit Tart.
		Grilled Sardines on Toast.

THIRD DAY.

Porridge	Irish Stew.	Sardine et Olives.
Fish	Duck Croquettes	Neapolitan Soup.
Devilled Kidneys	Cold Tongue	Beckti Mayonnaise.
Eggs to order	Cold Beef.	Duck Salmi.
	Vermicelli Shape & Stewed Figs.	Tongue en Aspic.
		Roast Capon & Ham.
		Roast Sirloin of Beef.
		Roast Teal.
		Cherry Tart.
		Insuing Pudding.
		Cheese Straw.
		Chocolate Ice Cream

FOURTH DAY.

Breakfast.	*Tiffin.*	*Dinner.*
Porridge	Mutton Cutlets.	Italian Soup.
Fried Beckti	Veal Mince Curry and Rice.	Braised Beckti.
Fresh Sausage	Cold Tongue	Pigeon Galantine.
Eggs to order		Roast Fowl.
	Cold Brisket of Beef	Roast Sirloin of Beef.
	Vermicelli Pudding	Strawberry Ice Pudding
		Maraschino Jelly.
		Eggs a la Farcics.